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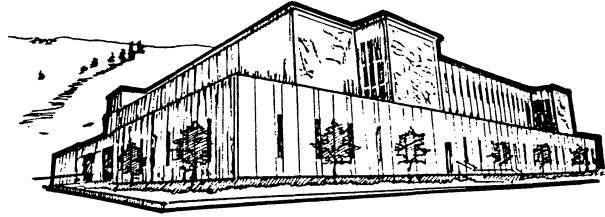
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**THE DESCRIPTION OF SEVEN POWERS-YONKEE ARTIFACT
ASSEMBLAGES AND THEIR CLASSIFICATION
IN NORTHWESTERN PLAINS PREHISTORY**

By

David M. Ferguson

Presented in partial fulfillment of the requirements

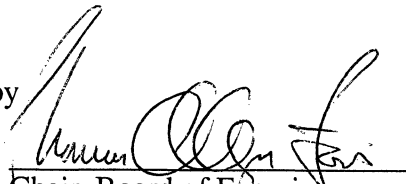
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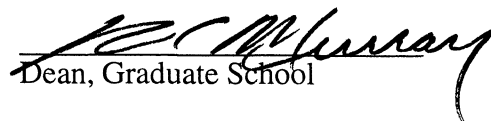
Master of Arts

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Ferguson, David Michael, M.A., December 1993 Anthropology

The Description of Seven Powers-Yonkee Artifact Assemblages and Their Classification in Northwestern Plains Prehistory (72 pp.)

Chair: Dr. Thomas A. Foor 

The Powers-Yonkee artifact assemblages in southeastern Montana and northeastern Wyoming were identified by a distinctive projectile point found in large bison kills. Previous interpretations tentatively placed this manifestation into the Middle Plains Archaic Period or McKean Complex.

A culture history of the Powers-Yonkee manifestation is constructed by comparing seven sites in order to identify: a) the characteristics of the Powers-Yonkee projectile point type; b) the material remains associated with the Powers-Yonkee projectile point; c) the known spatial and temporal parameters of the Powers-Yonkee manifestation; d) the formal attributes of associated features, and, e) the relationship of this manifestation to others in the regional cultural chronology.

Powers-Yonkee projectile points are associated with a period of time ranging roughly from 3100 to 2400 years before present. Current evidence suggests that Powers-Yonkee is in closer association, temporally and spatially, to the Late Plains Archaic Period corner-notched point tradition than to the McKean Complex. Powers-Yonkee may represent an early localized adaptation during the Late Archaic Period.

The Powers-Yonkee projectile point is associated with sites where bison were killed in a sophisticated, communal manner. Evidence suggests that bison were processed at these sites in a manner distinctive from later bison dependant cultures.

A stone and bison mandible feature may be characteristic of Powers-Yonkee components. The Powers-Yonkee manifestation also contains a variety of feature types known to occur in McKean Complex and Pelican Lake components, including stone rings and a variety of hearth and oven types. At this time it is not possible to distinguish a Powers-Yonkee component from preceding and proceeding cultures on the basis of feature types alone.

ACKNOWLEDGEMENTS

I would like to thank Gene Munson and GCM Services for the opportunity to participate in the excavations of 24RB1059 and 24BH2521, for the help and resources to complete this project. I would also like to thank Dr. Tom Foor for organizing this paper, Dr. Tom Roll for his contributions of time and data, and Dr. John Douglas and Dr. John Donahue for participating on my thesis committee.

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CHAPTER 1: INTRODUCTION

In the mid 1930s local ranchers discovered a bison kill site in Powder River County, Montana. This site was documented as 24PR5 in 1950 by the Smithsonian Institution River Basin Survey. In 1961, Members of the Sheridan Chapter of the Wyoming Archaeological Society conducted three excavations at 24PR5. The publication of their report led to the identification of a new projectile point type for the Northwestern Plains. Site 24PR5 became the type site for the "Powers-Yonkee" projectile point (Roll et al. 1991).

Currently there are few well documented collections containing this projectile type. Consequently, little is known about its spatial and temporal distribution, and the associated artifacts and features. Recent data from cultural resource management projects need to be synthesized with the original body of information to bring our understanding of the Powers-Yonkee cultural manifestation up to date.

I propose to construct a culture history of the Powers-Yonkee manifestation based upon information collected from three Powers-Yonkee campsites and four Powers-Yonkee bison kill sites within a geographical area I will call the Powder River Basin. This includes the region north and east of the Pryor and Bighorn Mountains, south of the Yellowstone River, east of the Bighorn River and west of the Black Hills. This culture history will be constructed with the following objectives: a) identify the geographical region associated with the Powers-Yonkee manifestation; b) identify the characteristics of the Powers-Yonkee projectile point type; c) identify the temporal range of the Powers-Yonkee manifestation; d) compare artifact collections and features from seven sites in order to identify the material remains associated with the Powers-Yonkee projectile point; and, e) evaluate the cultural chronology of the Powers-Yonkee with regard to Middle Plains Archaic and Late Archaic Period materials in the Powder River Basin region.

Theoretical Background

Studies of prehistoric cultures are generally built around a framework of cultural chronology. The cultural chronologies for the Northwestern Plains must be constantly evaluated as new data becomes available. I hope to provide a synthesis of information which contributes to our interpretation of the cultural chronology of the Powder River Basin Region.

Classification of artifact assemblages by artifact types is a fundamental archaeological operation. Lacking other cultural data, Northwestern Plains cultural chronologies are largely based upon projectile point types, under the assumption that cultural identity manifests itself in specific styles. Rouse (1986:3) states, "The inhabitants of an area who have laid down similar assemblages may be said to comprise a culturally homogeneous population or people." Technological changes, such as the appearance of the bow and arrows or pottery, are also used to define cultural periods. In this paper, I will distinguish Powers-Yonkee not only on the basis of its distinctive projectile point type but also by its association with distinctive bison processing techniques.

A cultural unit or group can be inferred by identifying formal attributes of material remains and their spatial distribution (Rouse 1986). In the study of Northwestern Plains prehistory, radiocarbon dates associated by stratigraphic context to a characteristic artifact type define the temporal distribution of the type. When the range of time, space, and form can be defined, the manifestation assumes identity as a (material) cultural unit (Rouse 1986). Using these dimensions, the identity of the Powers-Yonkee manifestation becomes apparent as a material cultural group. Evidence from bison kill and processing sites (Roll et al.1991; Frison 1991) substantiates the identification of distinct cultural behaviors as well.

The type and quantities of artifacts and features comprising an assemblage can lead to

inferences about particular activities such as lithic technology, subsistence strategy, resource use and land use. From an understanding of some particular behaviors and the associated artifacts and features, a cultural group can be identified. In this manner a culture history is constructed which is essentially a description of all material remains of the Powers-Yonkee manifestation, its associated temporal and spatial distribution, with inferences of cultural traits. Munson (1988, 1990, 1991a 1991b, 1992) constructed a database of intra-site spatial use for Late Prehistoric and Late Archaic components in southeast Montana. His data suggest that different cultural/temporal groups organize their living/cooking areas and midden areas in various ways. I will present the intra-site spatial use data from Powers-Yonkee components.

Because few Powers-Yonkee components have been identified or excavated, archaeologists have little information on this assemblage. Frison (1978: 210) speculated that Powers-Yonkee projectile points might represent a seasonal variation of the McKean Complex but decided that later information did not support this idea (1991:193). I propose that recent information from campsites containing Powers-Yonkee projectile points will corroborate the temporal placement of Powers-Yonkee by Roll et al. (1988).

Current archaeological literature contains many variations of Mulloy's (1958) chronological scheme for the Northwestern Plains. The period of time relevant to Powers-Yonkee is the Middle Prehistoric (Mulloy 1958), or the Middle Plains Archaic and/or Late Plains Archaic Periods (Frison 1991).

Absolute and relative dating information suggests the Powers-Yonkee manifestation occurred temporally between the McKean Complex and the corner-notched point tradition (Pelican Lake) associated with the Late Plains Archaic Period. Using Frison's (1991) chronology, I propose to place Powers-Yonkee firmly in the Late Plains Archaic Period. It is not a variation or sub-type of the McKean Complex (or Middle Plains Archaic

Period) as previously suggested in some archaeological literature (Miller 1985; Frison 1978). Stratigraphically and temporally, Powers-Yonkee is more proximal to Pelican Lake than McKean. The Powers-Yonkee manifestation may represent what Reeves (1970:68) calls a "regional subphase" of the Pelican Lake Phase. That is, the Powers-Yonkee manifestation may represent a regional adaptation by the same culture which later manufactured the corner-notched projectile point type called Pelican Lake. Temporal, cultural and technological evidence will be presented which identify the Powers-Yonkee manifestation as distinctive, but more similar to Pelican Lake than to McKean.

Research for this paper involved compiling and synthesizing all available data relevant to the Powers-Yonkee cultural manifestation. Excavation data from the following sites is used: the Powers-Yonkee Site (24PR5), the Kobold Site (24BH406), the Buffalo Creek Site (Mavrakis-Bentzen-Roberts, 48SH311), the Powder River Site (48SH312), the Cooley Site (24RB1059), Site 48CA1391, and the Spring Creek Site (24BH2521). These represent the most comprehensive excavations of sites containing Powers-Yonkee components.

The Cooley Site, Site 48CA1391, and the Spring Creek Site are interpreted as camp/occupation sites. The Cooley Site and the Spring Creek Site were excavated by GCM Services, Inc., Butte, Montana. This author helped excavate these sites, and conducted an analysis of the lithic materials from the Spring Creek Site, with the help of Dale Herbort. The other sites are bison kills; Kobold is a jump, and the other kills are presumed to be traps or pounds.

The Powers-Yonkee collections from the Cooley Site and Spring Creek Site were analyzed and compared to the collections from other Powers-Yonkee components. Projectile points from the campsites were compared to the results from Roll et al. (1991), who have analyzed the collections from the Powers-Yonkee bison kill site, and to

Miller's (1976) study of the collection from the Powder River Site.

I suspect that the recent re-evaluation of the Powers-Yonkee site by Roll et al. (1991), along with radiocarbon dates obtained from the Cooley Site, Site 48CA1391 and Spring Creek Sites will add confidence to the temporal placement of the Powers-Yonkee manifestation. New patterns of association may become evident from comparing information from these sites to future work. Perhaps, the construction of a culture history for the users of the Powers-Yonkee point will serve as a useful reference for future excavations and related research.

CHAPTER 2: METHODS

The Spatial Distribution of the Powers-Yonkee Manifestation

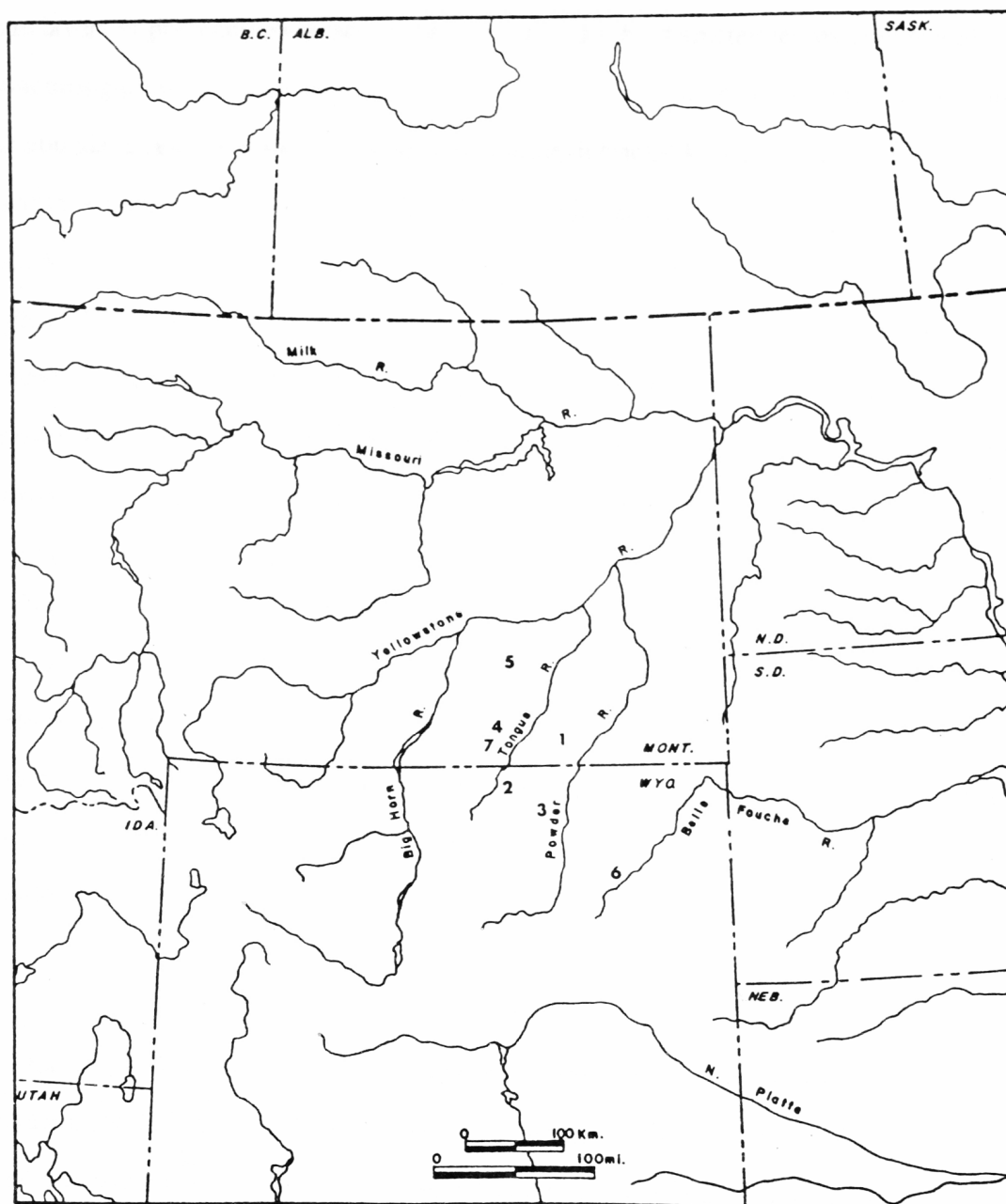
The geographical distribution of the seven Powers-Yonkee components addressed in this paper is illustrated in map figure 2-1. Currently, the distribution of all dated Powers-Yonkee components in the Northern Plains are proximal to the geological structural feature called the Powder River Basin. For purposes of this paper, this area has been extended and is defined as the region north and east of the Pryor-Bighorn Mountains, south of the Yellowstone River, and west of the Black Hills. The area I describe as the Powder River Basin is actually drained by these tributaries to the Yellowstone: Clarks Fork of the Yellowstone, Big Horn River, Little Bighorn River, Rosebud Creek, Tongue River, Pumpkin Creek, Mizpah Creek, Powder River, Fallon Creek, Belle Fourche River, and Little Missouri River.

The geographical area I have defined is a varied environment, ranging from semi-arid, shaley badlands in the northern Powder River Breaks to forested pine parkland. On the perimeters of this region, the Bighorn and Beartooth Mountains include high altitude environments, but no information about Powers-Yonkee materials is known from that high country. Within the Powder River Basin, the Pine Breaks Ecozones appear to have the highest density of prehistoric sites (Wettstead 1991). The Little Wolf Mountains, Long Pines, Chalk Buttes, and Ekalaka Hills are some named examples of Pine Breaks Ecozones. The Bull Mountains, north of the Yellowstone and the Black Hills are also characterized by this environment but Powers-Yonkee materials are not known to occur there.

Within the Pine Breaks are diversely vegetated riparian zones, rolling grasslands, sandstone ridges and upland zones. Sandstone ridges and upland zones are characterized

Figure 2-1: The spatial distribution of excavated sites containing Powers-Yonkee projectile points

Key: 1: 24PR5, 2: 48SH311, 3: 48SH312, 4: 24BH406, 5: 24RB1059, 6: 48CA1391,
7: 24BH2521



by outcrops of Fort Union Formation sandstone. Irregularly shaped coal and shale beds hold water at shallow depths resulting in numerous springs and small streams, despite the generally arid character of the region. Ignited coal beds baked silts or shales into red, porous scoria abundant on the hill tops throughout the region. Within these scoria caps are layers of porcelanite ("porcellanite", Fredlund 1976) characterized by conchoidal fracturing properties, and heavily used as a lithic source in prehistoric times. Porcelanite is abundant, readily worked, and easy to procure in brick-like slabs weathered from scoria outcrops or in gravels throughout the Pine Breaks areas. It occurs in various shades of grays, reds, yellows, and greens, and textures from dull to vitreous natural glass. The abundance of porcelanite in the Pine Breaks areas is reflected in the lithic use patterns observed in prehistoric assemblages in the Powder River Basin, including Powers-Yonkee. This strategy involves an emphasis upon bifacial reduction (flake cores are conspicuously absent) and there is little evidence of conservation (extensive use of waste flakes) of this material type. Conversely, the conservation of exotic cryptocrystalline silicates is seen, especially for endscraper tools. Large quantities of unused but highly suitable pieces of porcelanite are commonly found littering camp sites and lithic workshop sites. This contrasts with lithic remains at sites on the northern Montana and southern Saskatchewan plains, where lithic sources consist of small gravels and quartzite cobbles, lithic debris is minimal, and extensive conservation of lithic materials occurred.

Paleoclimate in the Powder River Basin

Campsites associated with McKean (24RB1164), Powers-Yonkee (Cooley and Spring Creek), and Pelican Lake (Cooley), occur by springs. This association indicates that regional groundwater conditions during those times resembled those of the present.

Paleoclimatic studies of the Northwestern Plains suggest that the vegetation communities changed little since the Powers-Yonkee occupation period (Bryson, et al. 1970; Knox 1983; Benedict 1985). There is some discrepancy between these studies, however. The Bryson et al. (1970) global model suggests that a climatic shift was occurring during the Powers-Yonkee temporal range. The Knox and Benedict studies are more regionally based and conclude that climatic conditions at the time Powers-Yonkee projectile points were used were well within the current range of seasonal variation (Knox 1983; Benedict 1985). Markgraf and Lennon (1986) examined a playa core from the Powder River Basin and concluded that the floral communities of the area have remained essentially constant since well before the appearance of Powers-Yonkee. They also acknowledge that grassland-sagebrush communities are resistant to severe conditions, and therefore may not reflect climatic changes.

Linda Cummings (1990) analyzed a soil column taken from 24RB1164, a stratified campsite located near a spring in the Pine Breaks area of Rosebud County, Montana. The purpose of her analysis was to interpret paleoenvironmental conditions from pollen types and relative amounts. She concluded that the spring has provided water throughout the period represented. Pollen types and proportions indicated that vegetation communities reflected somewhat drier climatic conditions up to and during the McKean occupation ca. 3310 years B.P. at this site. The vegetation communities reflected progressively moist conditions through the Pelican Lake occupation ca. 2570 years B.P.. Vegetation at this location varied in proportions, but not in species, during the past 3300 years.

A similar study (Cummings 1992) was conducted at the Spring Creek Site (24BH2521). The results indicated that previously abundant *Artimisia* (sagebrush) declined "severely", while *Pinus* (pine) and Cheno-ams (amaranth and pigweed families)

increased around the time of the Powers-Yonkee occupation at that site. A vegetation community dominated by sagebrush was replaced by a mixed grass community. This suggests a moderate increase in annual rainfall, which continued into the Besant cultural strata (ca. A.D. 200) at Spring Creek (Cummings 1992).

Potential Plant Resources of the Pine Breaks Ecozone

Rainfall in the Pine Breaks is slightly greater than in the badlands. Ponderosa pine/grassland savanna mingles with dry sage flats and lush riparian zones, creating numerous vegetation resources for humans and ungulates (Payne 1973). Stephen Aaberg examined floral remains taken from hearth and matrix soil samples at Spring Creek (Aaberg 1992). His analysis led to the discovery of charred *Chenopodium* (Goosefoot and other species) from hearths in the Powers-Yonkee component. Various species of *Chenopodium* are recognized ethnohistoric and ethnobotanical food plants among Plains Indians from historic times to Paleoindian (Aaberg 1992).

Margaret Van Ness identified charred seeds of *Chenopodium* (Goosefoot) and *Amaranthus* (Pigweed) from Feature 2 in the Powers-Yonkee component at 48CA1391 (McKibbin, et al.1988). It is possible that the recovered *Chenopodium* is not related to cultural use at these sites, and occurs in features only because of its general abundance in the site area. However, future investigations should address the possibility of *Chenopodium* as a food resource associated with Powers-Yonkee hearth or oven features.

Formal Characteristics of the Powers-Yonkee Assemblage

The Powers-Yonkee assemblage includes those artifact collections meeting the following criteria: 1) the collection includes the Powers-Yonkee style projectile point, 2)

the collection is associated, by radiocarbon dating, with a range of 2400 to 3100 B.P., 3) the collection was recovered from the Powder River Basin region of southeastern Montana and northeastern Wyoming.

Although these criteria were applied to archaeological materials available during research for this paper they are subject to change (particularly the spatial distribution) pending new information. Other criteria may apply after further research, for example: an association with unique intra-site spatial use characteristics (that is, features at a campsite distributed in an identifiable pattern), feature characteristics, etc.

Archaeological research in the Powder River Basin area shows that a wide range of projectile point types are found in this area. Projectile types associated with components following and preceding Powers-Yonkee include the corner-notched Pelican Lake style and the McKean Complex variants (Duncan, Hanna and McKean lanceolate) respectively.

Defining the Powers-Yonkee Projectile Point

The only stone artifact which formally distinguishes a Powers-Yonkee component from others in the region is the projectile point. Because of its importance to the identification of the Powers-Yonkee component, the formal attributes of the point style will be discussed. The following descriptions suggest that the manufacturers of the Powers-Yonkee projectile point had a preference for a particular shape (Munson and Herbort 1985; Young and Bonnicksen 1984). The assumption that this distinct style is the product of one homogeneous cultural group or that one cultural group produced only this style of projectile point is tenuous. Projectile point form is known to have changed systematically through time, as demonstrated by a number of stratified sites throughout the region (Frison, 1991:19-30). Northwestern Plains prehistoric artifact assemblages are generally classified on the basis of point type. It is generally understood that this

system is used in the absence of other cultural information (i.e. religion, social organization, language types, kinship structure, etc.). It is a weak means of classifying cultures.

Several authors have described Powers-Yonkee projectile point collections. Bentzen (1962a:12) described the Powers-Yonkee projectiles from the Buffalo Creek Site (or Mavrakis-Bentzen-Roberts) as follows:

The typical point is a sharp-pointed, straight-sided or slightly convex-sided, finely pressure flaked point with basal notch and corner notches giving a constricted base. Some bases are unnotched but slightly concave. These points are nearly all identical in size, shape, and material with those recovered from the [24PR5] Powers-Yonkee Bison Trap.

Frison (1968a: 33; 1970:11-13) described the projectile points from the Powder River Site, and the Kobold Site, Level II, respectively:

The projectile points vary from those which could almost be classified as stemmed to side-notched but a clustering occurs around a corner-notched type. Blade edges are usually convex although some are straight to concave. Bases are concave, but range to those with a definite base notch.

The type reflects a wide range but centers around a style that suggest a usually corner-notched dart point with blade edges nearly straight or slightly convex. Blade edges often tend to display a slightly convex [the illustration, page 12, indicates Frison meant "concave"] configuration at the point producing an extremely sharp tip for better penetration. Only four [of the Level II collection] lack base notches, and one of these was probably intrusive from Level III.

Roll et al. (1991: 56) examined several collections of points collected from the Powers-Yonkee bison kill by various individuals over many years. They measured thirteen quantitative attributes and statistically analyzed the entire collection. From this analysis, and the qualitative attributes of the relics, they developed this description of the formal qualities of the Powers-Yonkee point:

...a long, slender projectile point with notches placed low on the lateral edges creating the impression of a corner-notched or corner-removed point.

Bases are either notched or thinned to produce a small but obvious basal concavity. In many instances a single flake removed from each side of the base suffices to satisfy the requirement for a basal notch or indentation. The invariable presence of a basal concavity in conjunction with the low lateral notches creates the impression of small ears on either side of the base.

At the Cooley Site and Spring Creek Site the majority of Powers-Yonkee projectile points recovered are broken or exhibit evidence of having been resharpened (Figure 2-2). These points are characterized by a triangular shape, with straight sides. The proximal or hafting end can be generally described as corner-notched, or corner-removed in a manner which often creates small, sharp "tangs" at the proximal corners. The most distinguishing attribute is the presence of a basal notch along the proximal edge. This notch varies in width, but is present in all specimens.

The average length of the points from the Spring Creek Site and the Cooley Site is somewhat less than the collections from the kill sites described above. This is attributed to the reshaping of these specimens after damage to the distal end. For the purposes of this analysis, projectile points retaining an intact proximal end were considered diagnostic. At the Cooley Site, fifteen diagnostic Powers-Yonkee projectile points were recovered. Eight of these specimens demonstrate resharpening of the blade edges, generally to the extent that the point was exhausted. Four points are relatively complete, and three specimens consist only of the proximal portion. Because of the condition of the specimens from the Cooley Site the width of the neck (between the corner notches) was the only measurement which was compared to diagnostic Powers-Yonkee specimens from other sites. I hypothesized that neck width should remain fairly constant among Powers-Yonkee points, reflecting a specific hafting technology. The mean neck width from the Cooley Site is 13.67 mm. The extremes are 9 mm (two specimens) and 16.5 mm (two specimens).

Figure 2-2.

Powers-Yonkee Projectile points from the Cooley Site
and Spring Creek Site

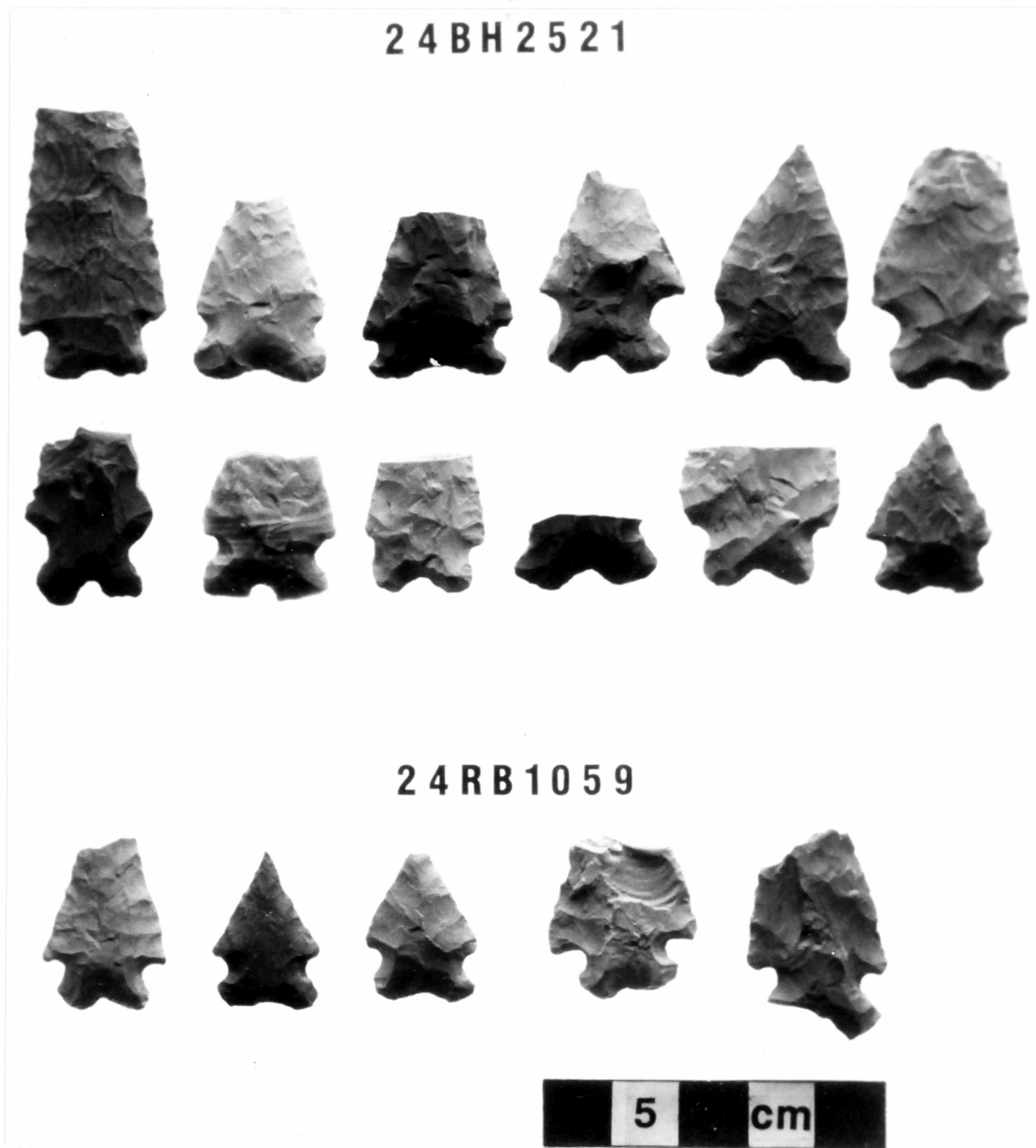


Table 2-1
Comparison of Mean Projectile Point Neck Width Between Sites

<u>Site No.</u>	<u>No.</u>	<u>Ave Neck Width</u>	<u>Extremes</u>
24RB1059	15	13.67 mm	9 mm, 16.5 mm
48CA1391	4	11.2 mm	9.7 mm, 13.4 mm
24BH2521	9	12.55 mm	12 mm, 16 mm
24PR5	85	14.4 mm	10.06 mm, 20.97 mm
average of means:		12.96 mm	

Four diagnostic Powers-Yonkee projectile points were recovered at 48CA1391. These show evidence of extensive resharpening. Two specimens appeared to have been used as knives (McKibbin 1988:43). The mean neck width of these specimens is 11.2 mm.

At Spring Creek, nine diagnostic Powers-Yonkee projectile points were recovered. Five specimens are impact-fractured at the distal end; one specimen is fractured in a manner consistent with manufacturing error, and three are complete but have been extensively resharpened (to an average of 24 mm in total length). Again, only the neck width is considered meaningful for comparison to other Powers-Yonkee collections. The average neck width at 24BH2521 is 12.55 mm, with extreme values of 12 mm (three specimens) and 16 mm (one specimen).

Roll et al. (1991) list the neck width for 85 specimens from 24PR5. The average neck width is 14.4 mm with a standard deviation of 2.02. The extremes are 10.06 mm and 20.97 mm. The neck width data was not available from the other reports of Powers-Yonkee collections.

The Powers-Yonkee projectile points from the collections discussed in this paper share a qualitative formal attribute--the presence of a basal notch or indentation on the proximal end. The variations in size and shape of the notches is not considered relevant in

recognizing this common quality. Factors that are difficult to control, such as anomalies in the raw material, individual preferences for the ideal shape, etc., discourage a more detailed analysis of projectile point formal variability.

The Powers-Yonkee projectile point is qualitatively similar to the Pelican Lake type, except for the addition of the basal notch. Also, there are qualitative similarities with the variants of the McKean Complex which often exhibit a basal notch or concavity. Temporally, in the Powder River Basin, the McKean Complex is followed by Powers-Yonkee, which is followed by Pelican Lake (Frison 1978). It is possible that the variation in projectile point styles from McKean to Powers-Yonkee to Pelican Lake represents transitional styles within a culture over time, but this is highly speculative without other corroborating evidence.

The Temporal Dimension

Dates discussed in this section are given in years before (1950) present (B.P.) and are uncorrected (uncalibrated). The original radiocarbon date of the Powers-Yonkee site (24PR5) was apparently erroneous. This proved to be an unfortunate stumbling block for researchers who later attempted to fit this component into Mulloy's (1958) outline, or other cultural chronologies of the region. The first Powers-Yonkee date came from "a charcoal specimen which was found in association with the skull and artifacts" (Bentzen 1961:118). The Isotopes, Inc. date (I-410) published by Bentzen (1961) was reported at 4450 +/- 125 years B.P. In this report, investigators C. Bertrand Schultz, Lloyd Tanner, and Robert Eisele called the associated bison skull an "intermediate form between *Bison bison* and *Bison antiquus*" (Bentzen 1961:118). The interpretation of faunal remains of an extinct form of bison seemed congruent with the date, and for years, Powers-Yonkee was firmly placed within the McKean Complex in northwestern plains archaeological

literature (for example, Frison 1970:26-28). Later excavations at the Mavrakis-Bentzen-Roberts Site produced dates of 2460 \pm 140 (lab no. RL-160) and 3600 \pm 200 (lab no. I-644). At the Powder River Site a date of 2910 \pm 140 (lab no. RL-162) was obtained (Frison 1991:34). These dates were accepted for some time as indicative of a phenomenal temporal range for the Powers-Yonkee manifestation (Kornfeld and Todd 1985; Frison 1978).

Wormington and Forbis (1965:37) questioned the original Bentzen date after further excavations yielded dates some 1500 years later. They comment that, "either this suggests a very great time range, something in the range of 2000 years for this type, or an error in dating." Finally, Frison (1978:203) questioned the interpretation of the Bentzen bison specimen from 24PR5, suggesting that the skull might represent "an unusually large modern male."

Site 24PR5 was reinvestigated by Gerald Clark and Robert Bump (Bump 1987:30) and a bone sample was dated at 2290 \pm 50 (Beta 6767). Roll, et al. reinvestigated 24PR5 in 1986 and obtained three (AMS) dates from charcoal and two dates from bone. These dates cluster around 2800 B.P.; substantially older than Bump's date. Table 2-2 illustrates the radiocarbon date ranges available for Powers-Yonkee, and Table 2-3 illustrates the distribution of these dates at one and two standard deviations.

Investigations at the Cooley and Spring Creek campsites corroborate the Roll et al. dates at the Powers-Yonkee site, Bentzen at Mavrakis-Bentzen-Roberts, and Frison at the Powder River Site (Munson 1988, 1992). Currently, the widest acceptable range for dates associated with Powers-Yonkee projectile points is 3089 \pm 207 B.P. (Roll et al. 1991) to 2290 \pm 50 B.P. (Bump 1987). Given the possible anomalies which can influence carbon 14 dates, this is a remarkably short time span for the appearance and disappearance of the Powers-Yonkee type. By comparison, the accepted temporal ranges

for the McKean Complex and the Pelican Lake Phase are over 2000 years.

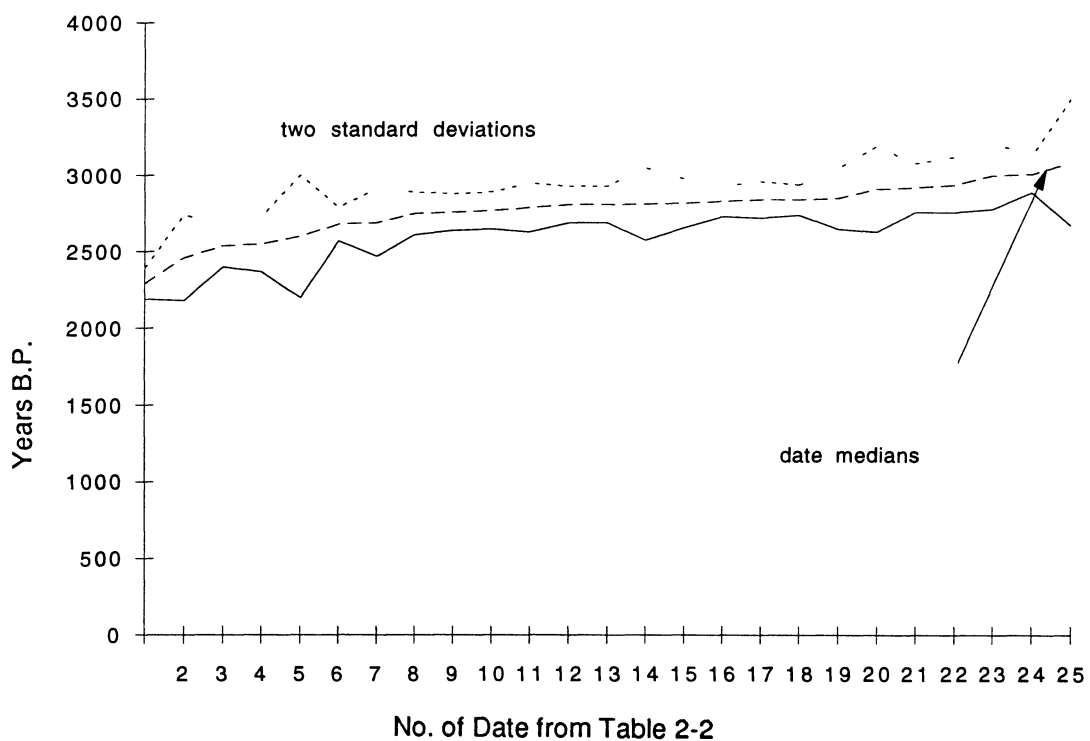
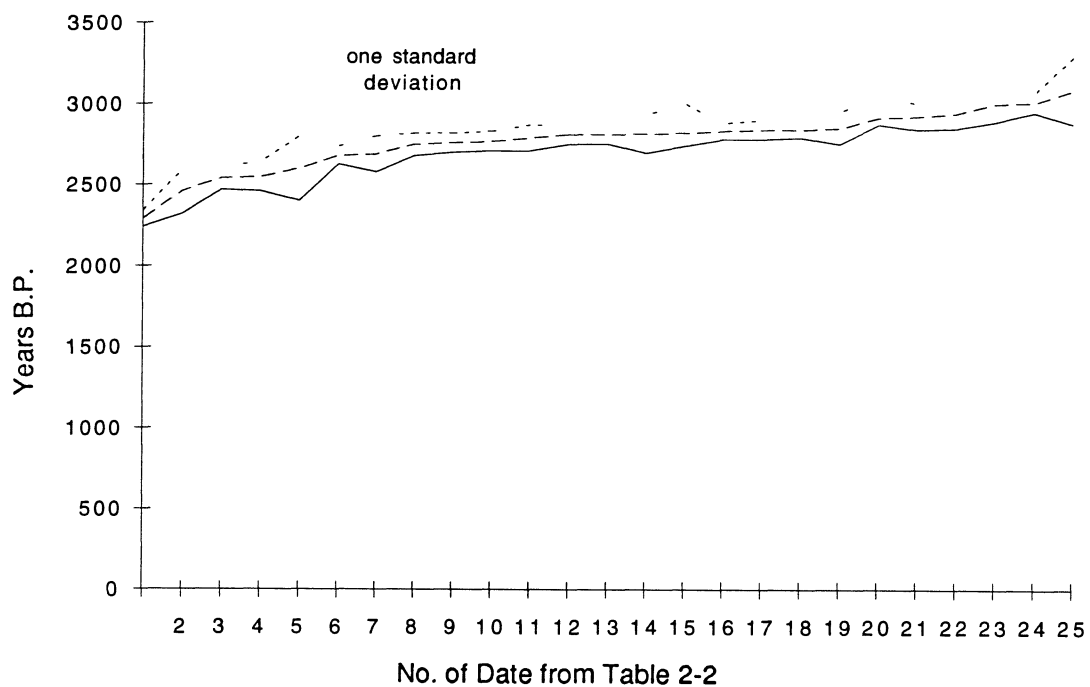
It has been demonstrated that the core of a standing dead Ponderosa Pine in the Powder River Basin environment can radiocarbon date to 400 \pm 60 B.P. (Munson, 1991). At two sigmas (standard deviations), there is a 95% likelihood that this tree is between 280 and 520 years old. The likelihood of dating old wood verses the "target" event gives added emphasis to the comparatively narrow temporal distribution of the Powers-Yonkee dates in table 2-3. A radiocarbon date from bone should ideally accompany one from charcoal, when possible. I did not attempt to calibrate or "correct" the radiocarbon dates, which would slightly adjust the uncorrected dates. Table 2-3 presents date ranges carried to two standard deviations; this span implies a 95% likelihood that the actual date of the material falls within the range given.

At 24PR5, the date obtained by Bentzen in 1961 and the date obtained by the BLM (Bump 1987) in 1983 do not fall in the range of two sigmas of other dates obtained by Roll, et al. from the Powers-Yonkee bison kill. It is likely that these dates record unrelated events or reflect errors in dating. The BLM date (Bump 1987) does fall within the range of two sigmas of dates from 48SH311 and Spring Creek, Feature 6-B, and can not be discounted as relating to a Powers-Yonkee component.

Additional questions about the results of radiocarbon dating are raised in the cases where the charcoal from a hearth is divided into two nondistinct samples for dating, and different results are obtained. Four features, feature 1B at the Cooley Site, and features 1, G1D-2, and G1D-5, at Spring Creek, had sufficient charcoal to run two radiocarbon dates for each feature. The charcoal from each hearth was randomly divided into two samples (Table 2-2). Ideally, two date intervals from the same hearth should reflect the same event, that is, the time that the firewood used in the hearth ceased to absorb C-14. However, Feature G1D-2 (numbers 13 and 14) and G1D-5 (numbers 15 and 16) have a

Table 2-2. Radiocarbon Dates (uncorrected) from Powers-Yonkee Components

Date No.	Site Number	Year	Feature no.	C-14 Date, Years BP	Lab Number
1	24PR5	1961		4450+/-125	I-410
2	24PR5 (Bump)	1983	#	2290+/-50	BETA-6767
3	24PR5 (Roll)	1986		2680+/-55	AA-2365
4	24PR5 (Roll)	1986		2790+/-80	AA-2366
5	24PR5 (Roll)	1986		2770+/-60	AA-2367
6	24PR5 (Roll)	1986	#	3089+/-207	A-4919
7	24PR5 (Roll)	1986	#	2813+/-119	A-4920
8	48SH311	1962		2600+/-200	I-644
9	48SH311**	1962		2460+/-140	RL-160**
10	48SH312	1968		2910+/-140	RL-162
11	24RB1059	1987	1B (a)*	2820+/-80	BETA-22510
12	24RB1059	1987	1B (b)*	3000+/-110	BETA-23886
13	24RB2521	1991	G1D-2 (a)*	2810+/-60	BETA-50625
14	24RB2521	1991	G1D-2 (b)*	3010+/-60	BETA-50626
15	24RB2521	1991	G1D-5 (a)*	2810+/-60	BETA-50628
16	24RB2521	1991	G1D-5 (b)*	2540+/-70	BETA-50629
17	24RB2521	1991	1 (a)*	2840+/-60	BETA-50634
18	24RB2521	1991	1 (b)*	2750+/-70	BETA-50635
19	24RB2521	1991	G1-5B	2940+/-90	BETA-50612
20	24RB2521	1991	G1D-3	2920+/-80	BETA-50627
21	24RB2521	1991	18	2850+/-100	BETA-50642
22	24RB2521	1991	12	2690+/-110	BETA-50639
23	24RB2521	1991	6-B	2550+/-90	BETA-50637
24	48CA1391~	1986	1	2830+/-50	BETA-17007
25	48CA1391~	1986	6	2840+/-50	BETA-23789
26	48CA1391~	1986	2	2760+/-60	BETA-17007
* = a feature from which two dates were obtained, ** = Frison (1978: 47,55)					
# = carbon sample is from bone (all others charcoal), ~ = Albanese (1986)					

Table 2-3: Distribution of Radiocarbon Dates from Table 2-2

common date of 2810 \pm 60 for respective sample A's, yet are widely different (3010 \pm 60 and 2540 \pm 70, respectively) for respective sample B's. Both sets of samples contained ample amounts of carbon (Munson, 1992). Are these dates representing coeval events between features? Are these dates representing coeval events within features?

By performing a two-tailed T-test (Thomas 1976:249-250), I tested the relationship between two dates from one feature (Table 2-4). The results of this test indicate that for Feature 1B (Cooley) and Feature 1 (Spring Creek) the dates reflect the same event, and for Features G1D-2 and G1D-5 (Spring Creek), the dates, in all likelihood, reflect separate events. Interpretation of this test is either: a) the samples from G1D-2 and G1D-5 were unknowingly weighted with firewood of widely different ages; b) random error or contamination during the process; or, c) these hearths were used and re-used again many years later. The first two possibilities seem most likely. If the last interpretation is accepted, why was re-use of old hearths (perhaps decades apart) desirable? One interpretation is that rebuilding the old hearths was easier than constructing new ones, or there may be a cultural preference for reusing the same location.

Table 2-4. Two-Tailed T-tests on Pairs of Dates from Four Hearths

A Statistical Comparison of Pairs of C-14 Dates From Powers-Yonkee Features
Based upon Thomas (1976:249-250) Two-Tailed T-Test

Feature No. & (sample)	Sample Mean	One Standard Deviation	Calculations of Standard Error of Deviation of Sample Means	tabled value of Sigma (.05)=1.96
1B, (a)	2820	80	3000-2820=180	1.32<1.96
1B, (b)	3000	110	sq. rt. (80*80+110*110)=136.01	accept null hypothesis
1, (a)	2840	60	2840-2750=90	0.98<1.96
1, (a)	2750	70	sq. rt. (60*60+70*70)=92.2	accept null hypothesis
G1D-2, (a)	2810	60	3010-2810=200	2.36>1.96
G1D-2, (b)	3010	60	sq. rt. (60*60+60*60)=84.85	reject null hypothesis
G1-D5, (a)	2810	60	2810-2540=270	2.92>1.96
G1-D5, (b)	2540	60	sq. rt. (60*60+60*60)=92.2	reject null hypothesis

CHAPTER 3: ANALYSIS OF SEVEN SITES

The Powers-Yonkee Bison Trap, 24PR5

The Powers-Yonkee site lies along the bank of a small arroyo on BLM administered lands adjacent to the Fred Yonkee Ranch in Powder River County, Montana. Initial excavation of 24PR5 was carried out by members of the Sheridan Chapter of the Wyoming Archaeological Society in 1961 under the direction of Raymond Bentzen. Extensive relic collecting had previously occurred at the site with "hundreds of projectile points carried away" (Bentzen 1961: 7).

The site is a stratum of *Bison bison* bones (Roll et al. 1991) located in the banks of a small arroyo. Bentzen carried out excavation in three locations on the site. A total of 100 stone artifacts was recovered, including 95 projectile points or point fragments. Of these, 50 specimens were "sufficiently complete to be identifiable". Bentzen reports that, in conversation with others who collected from the site, artifacts other than projectile points were rare (Bentzen 1962b:118).

Bentzen (1961: 7) interpreted the site as a trap, incorporating the arroyo and surrounding topography:

It appears that ancient man probably drove the bison from the broad valley or collecting basin in the large, north-south arroyo; then, with the aid of a barricade, shunted them into the smaller, east-west arroyo, which at that time probably had more or less vertical walls. In the east or upper end of this arroyo, the bison were helplessly trapped, and it was an easy matter for the hunters to slay them at practically point-blank range with their stonetipped projectiles. The rib-cage was apparently the favorite target area on the bison...

In 1983, archaeologists from the Miles City District of the Bureau of Land Management revisited the Powers-Yonkee site. A stratigraphic profile was recorded by Robert Bump and a sample of bone was collected for dating by Gerald Clark (Bump

1987). The stratigraphy suggests that only one cultural deposit existed (Bump 1987:33). Bump describes the formation processes that occurred at the site as an original deposition of bone and cultural material in a dry arroyo bottom, and "subsequent covering of this layer with 89 to 104 centimeters of alluvium and colluvium through bank sloughing, arroyo side cutting and mass wasting of slopes above the cultural layer" (Bump 1987:33). Bump mentions that these processes created similar profiles at the Koepke Bison Kill Site (24GF270) and the Ayers-Frazier Bison Kill Site (24PE30). These sites are associated with Pelican Lake points and date to around 2300 and 2180 \pm 150, B.P., respectively (1987:34).

In 1986 Roll et al. extensively tested site 24PR5 in conjunction with Montana State University and The Bureau of Land Management. The total site area was established for the first time using systematic auger tests (Roll et al. 1991:9). Subsequently, test excavations were conducted in three locales: Areas B, C, and D.

Analysis of the bison bone from the test excavations in Area B and C revealed no evidence of stone boiling and no fire-cracked rock was recovered from the site (Roll et al. 1991:14). At Areas B and C, a low degree of skeletal articulation remained, and some bones were apparently removed for further processing (Roll et al. 1991:14). Broken bones occurred more frequently in Areas B and C than in Area D (Roll et al. 1991:62).

Faunal remains from Area D showed no breakage for marrow extraction and exhibited a high degree of articulation. Also, a greater range of skeletal elements was found in Area D (Roll et al. 1991:19). In Area D "butchering appears to have focused on removal of muscle tissue without the more extensive processing seen at later bison kills of the Northwestern Plains" (Roll et al. 1991:19). The butchering strategy suggested by Roll et al. for Area D agrees with Frison's (1978) interpretation of the Mavrakis-Bentzen-Roberts site and the Powder River Site.

Ken Deaver examined the faunal remains collected in 1986 and determined that only *Bison bison* is represented in 24PR5 (Roll et al. 1991). This analysis finally resolves the confusion resulting from Bentzen's reported recovery of "an intermediate form between *Bison bison* and *Bison antiquus*..." (Bentzen 1962b:118). This original interpretation, in conjunction with Bentzen's suspiciously early carbon date, led to misinterpretation of the temporal placement of the Powers-Yonkee component for nearly thirty years.

The result of the 1986 faunal analysis shows a mix of animal ages from less than six months to maturity, with both sexes represented. The season of the kill at 24PR5 was tentatively placed in mid to late summer (Roll et al. 1991:62) but more excavation was recommended in order to verify this.

In contrast to Bentzen's interpretation, the 1986 investigation suggested that there is no geomorphological evidence of an arroyo being used in the bison trap. Instead, the present arroyo appears to have formed after the event, and in the continuing formation of the arroyo, the bones were covered and preserved (Roll et al. 1991:65). This scenario is presented:

The kill appears to have taken place near the head of a shallow valley some 50 to 75 meters wide. The downstream slope in the area of the kill(s) did not likely exceed 5 percent. After the kill(s) it appears that the valley began to fill fairly rapidly as the excellent preservation of the bones does not indicate extensive exposure.

Albanese (1978:58-59) concludes that the bone beds at 48SH311 also occurred in a shallow valley, rather than a steep-walled arroyo (Roll et al. 1991).

Roll et al. do not make any suggestions for the mechanism used to trap the bison. If the interpretations by Roll, et al. and Albanese are correct, neither a snowdrift trap nor a natural barrier was used. Frison (1978:223) proposes that the Besant Phase on the Northwestern Plains was characterized in part by highly sophisticated bison hunting:

...the Besant cultural incursion into the Northwest Plains brought with it, or else developed there, the most significant bison procurement methods the world has ever seen. Hunters were able to incorporate sophisticated artificial structures into certain features of the natural topography and produce highly efficient buffalo corrals or pounds. As a result, these hunters were less dependent upon the arroyo trap and the jump and consequently could set up operations in a wider variety of favorable bison habitat areas...The corrals, the weaponry, and the drive lane complexes reflect a high level of competence in handling bison and careful attention to the details that helped ensure success...Besant was actually a cultural climax--at least in terms of bison procurement--that was never reached again on the Northwestern Plains.

If an artificial barrier such as a corral was constructed, as opposed to the use of a fortuitous arroyo, this met the criteria for "sophisticated" bison hunting Frison reserves for the Besant Phase. The Besant Phase occurs in the Powder River Basin 500 to 1250 years after Powers-Yonkee (Hughes 1981; Davis 1982; Frison 1978). Besant is represented at the Kobold Bison Kill, stratigraphically above Powers-Yonkee (Frison 1970), at the Ruby Pound on the upper Powder River (Hughes 1981), and throughout the Pine Breaks in small campsites (Munson 1990, 1991a, 1991b, 1992).

The 1986 excavation of 24PR5 resulted in the recovery of five projectile points. Roll et al. compared these specimens quantitatively and qualitatively to those recovered by Bentzen, and to others recovered from 24PR5 by R.D. McCurdy in the 1930s. The conclusion is that all projectile recovered from 24PR5 represent the Powers-Yonkee style (Roll et al. 1991).

The Kobold Site, 24BH406

The Kobold Site is located at the head of Rosebud Creek at the site of the Rosebud Battlefield. It is approximately seven miles north of the Spring Creek Site (24BH2521). The site is an apparent bison jump with three bone layers representing three different cultural components. A fourth component was discovered below the bone layers and

apparently is not related to the bison jump feature. Petroglyphs and drive lines present at the site were attributed to the Late Prehistoric Period (Frison 1970:9).

The physical setting of the site is a shallow slope from the base of a twenty-five foot high sandstone cliff to the creek bottom. Frison suggests that the topography at the site would require a varying approach to the cliff over time. The locations of the various components in relationship to the cliff face are the basis for his hypothesis.

The site was discovered by Joe Dent of Miles City, Montana around 1960 (Frison 1970:2). One of the owners of the site, George Kobold, initiated a pair of trench excavations through the cultural deposits in a manner Frison (1970:2) characterized as "surprisingly systematic."

In 1968, George Frison oversaw the excavation of an exploratory trench by a crew of students from the University of Wyoming along with members of the Wyoming Archaeological Society. The lowest cultural stratum discovered in this trench was designated Level II (after the fourth and lowest stratum was discovered later). Level II is the Powers-Yonkee component at Kobold. Frison notes that bone preservation in Level II was better than in the upper and newer strata (Frison 1970:6). He speculates that this resulted from different butchering techniques employed by the hunters. Frison characterized the projectile points from Level II as "a single projectile point style with little variation and there is no suggestion that it was the result of more than a single cultural group" (1970:7).

Of the raw material types in the lithic collection in Level II, local porcelanite represented 84% of the total (Frison 1970:11). A total of 33 diagnostic projectile points or point fragments was recovered from Level II, along with 18 non-diagnostic specimens. Frison reports the recovery of 751 tool sharpening flakes, 62 flakes "reflecting other stone flaking processes," two "essentially complete" bifaces, six biface

fragments, and eight retouched flakes from Level II. A bead made of freshwater clam shell and two granitic cobble hammerstones were recovered in Level II (Frison 1970).

Faunal analysis of Level II was hampered by the decomposition of the bone. *Bison bison* was the only species associated with the cultural component. A minimum of 65 individual bison were distinguished in level II. Frison (1970:15) described the butchering process as follows:

Remains suggest that, in some cases meat was probably stripped from carcasses, while in other cases carcasses were disarticulated and bones deliberately broken. Some bone appear to have been deliberately cracked to obtain marrow, especially femora, humeri, tibiae and radii in that order of preference. Others appear to have been broken from other causes, one of which appears to have been the fall over the cliff.

The observation of both articulated carcasses as well as some utilization of marrow agrees with the description by Roll et al. (1991) at 24PR5. This pattern of bison processing is unlike that associated with later cultural/temporal groups, distinguishing Powers-Yonkee from later cultures which practiced extensive stone boiling of bison bone, marrow extraction and pemmican production. The treatment of bison resources by Powers-Yonkee may more closely approximate preceding cultures in this regard.

Frison interprets the scarce and fragmentary bone material in Level III (Besant) and IV (Late Prehistoric) as suggesting that later cultures utilized a different strategy in butchering their kill, removing most parts of the carcasses in the process. Lithic evidence suggests that as many or more bison were killed in these components as were killed in Level II (Frison 1970:18). He hypothesizes that bison kills of this type were carried out in late summer and fall, although the faunal analysis was not complete enough to demonstrate this. Frison's interpretation suggests the kills were a communal effort directed towards meat drying and storage strategies for the winter (Frison 1970:28).

The Mavrakis-Bentzen-Roberts Bison Trap Site, 48SH311

Site 48SH311 (also appears as the Buffalo Creek Site) is located on a private ranch on a tributary of Buffalo Creek, about thirty miles east of Sheridan Wyoming. It underwent two years of indiscriminate pothunting before the Wyoming Archaeological Society began a systematic investigation under the direction of Raymond Bentzen in 1962. The University of Wyoming excavated the site under the direction of George Frison in 1972.

Bentzen (1962a) describes the physical setting as being similar to that at 24PR5: a steep-sided blind arroyo tributary to a main drainage. Bentzen proposes that the hunters used a barricade to funnel bison into the blind arroyo, where they were trapped and slaughtered. Albanese (1978:58-59) did not find stratigraphic and geomorphological evidence of this interpretation, and suggested that the original setting was a shallow valley rather than an arroyo. Evidence of a corral structure may not have survived through time and none was reported from the site.

Nine feet of overburden was removed to reach the bone layer. The cultural stratum was 12 to 14 inches thick. Bentzen reported that the slope of the bone stratum was consistent with the modern ground surface, indicating that the general shape of the land was constant over time. Two areas were excavated within the site.

Faunal analysis in the initial investigation was limited to the identification of the species, *Bison bison*, and the number of animals excavated. In Area 1, remains of 26 bison were recovered. The density of carcasses was one animal per four square feet. In Area 2 the remains of seven bison were recovered in a less dense arrangement. One "leg bone" demonstrated fracturing for marrow extraction, a thoracic vertebrae had a distal fragment of a projectile point imbedded in it, and interestingly, another fractured leg bone was recovered with a stone wedge still lodged in an attempt to further split the bone.

Further analysis of the faunal remains at the University of Wyoming (Frison

1978:206) indicated that the kill took place in late Winter to early Spring, prior to calving, but also found evidence that another kill might have occurred in the Fall. Frison (1978:206) speculates that the size and extent of the site indicated multiple kill episodes.

Frison (1978:206) characterizes the butchering process as a "muscle-stripping process, in which little or no attention was paid to the marrow of the long bones." Frison reports no evidence of chopping marks common to some other bison kill sites but does report cutting tool marks. Frison notes the similarity of butchering treatment at 48SH311, 48SH312, and 24PR5 and suggests this might be a cultural trait (1978:207). Roll et al. (1991) corroborated this theory with evidence from part of site 24PR5, but also found evidence of possible marrow extraction at other areas of that site.

Both excavations of 48SH311 suggest another possible behavioral trait (Bentzen 1962a:12, Frison 1978:208). The *in situ* exposure of projectile points from articulated carcasses revealed a preference for dart placement in the neck and rib cages of the bison. This indicates that the animals must have had restricted mobility. Both Frison and Bentzen note the presence of this trait at the Powers-Yonkee Site. Bentzen reports an average of 2.5 projectiles per animal in Area 1 and 2.4 projectiles per animal in Area 2. Frison describes two cow carcasses with one and two projectiles in the neck, respectively, and two calf carcasses with one projectile in the rib cage of each. No physical evidence of a corral was found to corroborate this interpretation, but such evidence of a wooden structure is not likely to survive under less than ideal conditions. It appears that topography was used to direct the bison into a trap

A radiocarbon date of 2600 \pm 200 years B.P. was obtained from a charcoal sample by Bentzen, and a date of 2460 \pm 140 years B.P. was obtained from a charcoal sample by Frison. Unfortunately, no mention was made in either report of how the charcoal samples were associated with the kill event itself. The range of these dates are consistent

with other accepted Powers-Yonkee dates.

A total of 87 stone artifacts was recovered by Bentzen at 48SH311, including 81 projectiles or projectile point fragments. Of these, 53 were diagnostic proximal ends. Bentzen reports that 81% were made of "altered shale" (porcelanite), 11% of quartzite, and 7% of agate. One artifact is described as a "smooth, flat, round polished stone of granitic material." A biface fragment and four scraper tools complete the collection from 48SH311.

Interestingly, no evidence of projectile point re-use is found at any of the Powers-Yonkee bison kill sites. An analysis of the projectiles from 48SH311 was conducted by Miller (1985) in order to evaluate the degree of projectile point re-use in the Powers-Yonkee kill sites. Miller analyzed 170 projectile points from the two excavations mentioned, along with the private collections from the early relic hunting at the site. He determined that 47% of the points were 85 to 100 percent complete (suitable for resharpening) which indicated no attempt to retrieve and conserve used projectiles. As the overwhelming majority of points are made of locally abundant porcelanite, there evidently was no shortage of raw material.

At the Cooley Site and Spring Creek, the relatively few projectiles recovered did show signs of resharpening. At the Powers-Yonkee bison kill sites this is not the case. Miller (1985) speculates that a mass production of points was initiated specifically for the kill events and they were abandoned afterwards. Dale Herbort (personal communication, 1992) has demonstrated that a Powers-Yonkee projectile point can be replicated in about fifteen minutes from a suitable large flake or crude biface.

The Powder River Site, 48SH312

The Powder River Site was excavated in 1966 by the Wyoming Archaeological

Society under the direction of George Frison. This site is located on a steep arroyo bank above a dry tributary to the Powder River in shaley breaks country. The physical setting is very similar to the setting at the Mavrakis-Bentzen-Roberts Site a few miles to the west. As was the case at 48SH311, there was about ten feet of overburden above a stratum of bison bone. A large portion of the site area had been destroyed by erosion of the arroyo, as evidenced by the occurrence of the bone layer on each side of the arroyo cut.

The remains of twelve bison were exposed during excavation. These were determined to be the modern form. Carcasses were fairly well articulated, though the hind quarters were often missing. Frison (1968a) describes a butchering process similar to that found at the Powers-Yonkee Site and the Mavrakis-Bentzen-Roberts Site in that the bones showed little or no evidence of marrow extraction or chopping tool use. Analysis of the bones suggests the "butchers were taking whatever was easiest to obtain from each carcass. Front quarters were especially ignored although the meat could have been stripped from the bones to a large extent before they were abandoned" (Frison 1968a:33).

In contrast to later period kill sites, the hunters at 48SH312 did not use some of the bison parts which were available. Inspection of the skulls indicated no attempt to remove either the brains or tongue. Rib cages and vertebrae were well articulated, consistent with the muscle-stripping process found at the Powers-Yonkee and Mavrakis-Bentzen-Roberts sites. There is no definitive explanation for this unique situation.

All bison found at the site were adults. Frison (1968a:34) suggests that foetal or calf carcasses may have been removed, as was the case at other Late Prehistoric Period kill sites. Because only a portion of the site area remained for excavation, Frison felt that estimates of season were speculative at best.

Artifacts recovered at 48SH312 included 25 Powers-Yonkee type projectile points. Of

these, 20 are porcelanite, three are quartzite, and two are chert. Frison (1968a:34) reported recovering 106 small flakes. Of these, 47 are retouch flakes from unifacial scraping-type tool sharpening. One bone needle was recovered from the site.

The butchering techniques employed by the prehistoric hunters at 48SH312 is apparently similar to that of the Powers-Yonkee Bison Kills and the Powder River Site. The topography of the arroyo may have figured into the method of hunting. Geological investigations at Mavrakis-Bentzen-Roberts were conducted by C. John Mann (1968). He concluded that the kill activity occurred on the original arroyo floor. No evidence of an artificial barrier such as a corral was found, but the use of a barrier cannot be ruled out. Albanese (1978) concluded that the arroyo post dates the cultural stratum, contradicting the earlier interpretation. Again, it seems the valley topography played a role in directing the bison, but they were probably trapped in an artificial structure as opposed to a fortuitously occurring arroyo.

As was the case at 24PR5 and 48SH311, the bison were apparently killed by a few carefully placed darts. Sixteen projectiles were recovered from the ribs or vertebrae. One carcass contained four points, three carcasses contained two points, and six carcasses contained only one point (Frison 1968a:33). The evidence from the Powder River Site again indicates that the bison were trapped.

A radiocarbon date for the Powder River Site, reported by Frison (1978:205), is 2910 \pm 140 years B.P. (RL-162). The date is based upon a charcoal sample, but no description of the relationship of the charcoal to the bone stratum is provided. This date interval is within the range for Powers-Yonkee components at other known sites.

The Cooley Site, 24RB1059

Excavation of the Cooley Site was conducted by GCM Services in 1987, under the

direction of Gene Munson. I was employed as a field crew member and assisted in the excavation of the Cooley Site and the adjacent Medicine Root Site (24RB879). The Medicine Root Site also produced a Powers-Yonkee projectile point, but the site was largely deflated and offered little information.

The Cooley site was recorded in 1973, following a period of pot hunting damage. The site was located within the boundaries of Western Energy Company's Area C Mine. It was excavated to mitigate the effects of a planned box cut and overburden pile, which have since caused significant alterations to the local landscape. The site was near the old Cooley homestead, and much of the site area was plowed in the early 1900s. The Cooley site was situated in a sheltered basin between two small hills near a permanent spring. The original extent of cultural material is unknown, but artifacts were reportedly collected for some time from a crescent-shaped field around the spring. A total of 289 square meters of site surface was excavated from three locales around the spring (Figure 3-1). Areas A and C had not been previously cultivated. Cultural material occurred from the surface to 40 cm below the surface. The three components were identified as Powers-Yonkee, Pelican Lake, and Late Prehistoric. The Late Prehistoric Period component was fairly shallow, and clearly separate from the other components.

The Pelican Lake and Powers-Yonkee components comprised the bulk of materials recovered. A total of 61 corner-notched (Pelican Lake) and 15 diagnostic Powers-Yonkee projectile points along with 47,905 pieces of lithic debitage was recovered at the Cooley Site, of which 97% was porcelanite. The stratigraphic profile was not defined well enough to differentiate the distributions of lithic debitage between the Powers-Yonkee and Pelican Lake components. An exception to this is a flake cluster found in association with Feature 1B, a hearth of Powers-Yonkee age.

Throughout most of the site, hearth dates clustered around A.D. 200 and were

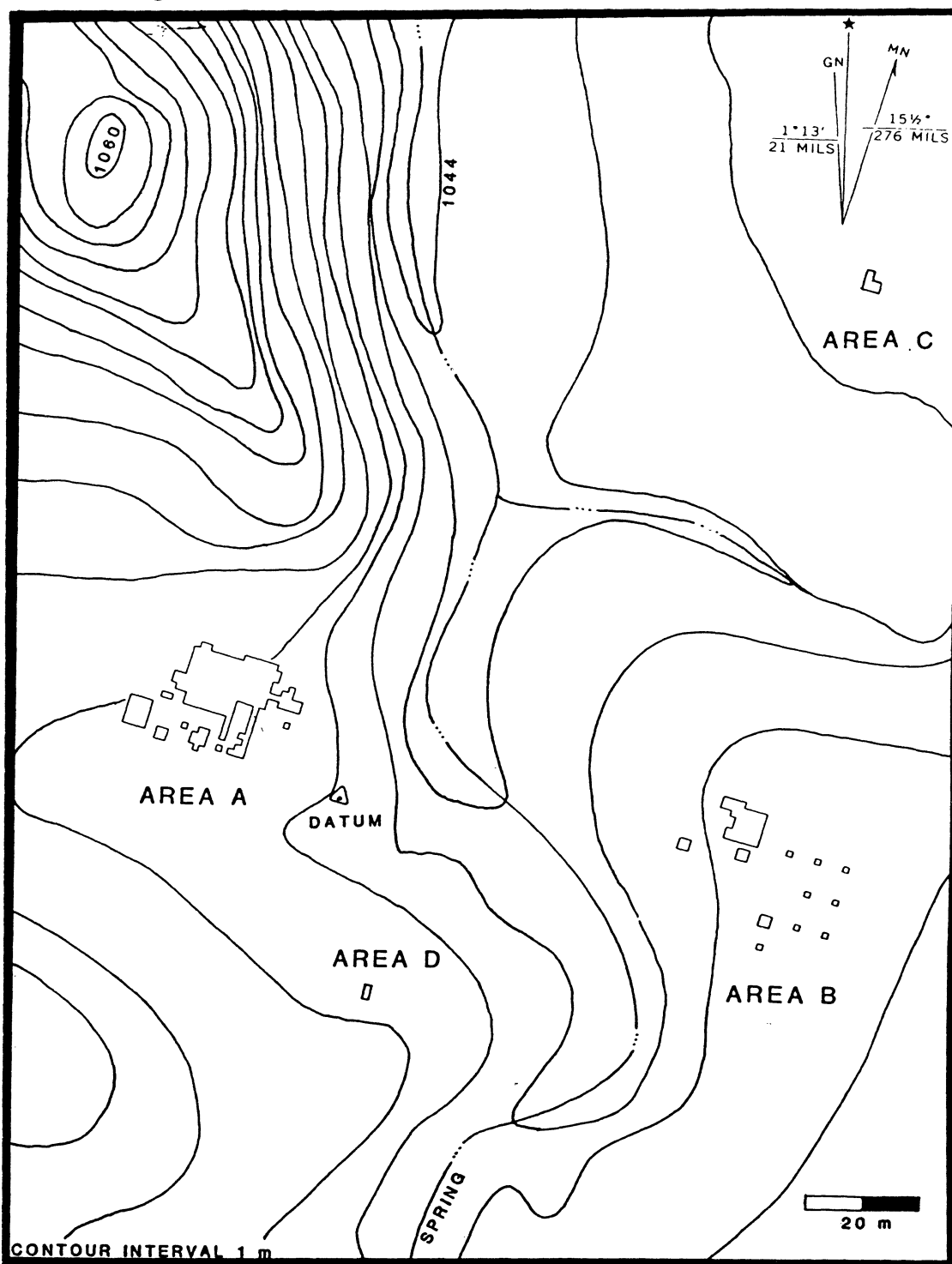
attributed to the Pelican Lake Component. Both Pelican Lake and Powers-Yonkee Projectiles were recovered from these features and surrounding areas. One interpretation of this mixed component is that people of the Pelican Lake Phase camped on the site of the previous Powers-Yonkee camp, and soil development was insufficient to separate the cultural strata. Another possibility is that rodent activity blended the strata (Munson 1988).

Munson (1988) hypothesized that the later occupants had reconstructed existing hearth features and/or removed the sandstone slabs and fire-cracked rock (FCR) from them in the process. The site is several hundred meters from the nearest source for sandstone slabs, suggesting that the re-use of available sandstone slabs would have been preferable to procuring new materials at some distance and carrying them to the site. Partially dismantled hearth features corroborated the notion of re-use of sandstone slabs.

Two large midden features containing fire-cracked sandstone, charcoal fragments, particles of bone, and flakes were discovered on the east side of the Area A excavations. Both Powers-Yonkee and Pelican Lake projectiles were recovered. The east side of Area A sloped gradually toward the spring's drainage. One interpretation is that the later occupants disposed of unsuitable debitage and FCR debris and cleaned out hearth pits, dumping baskets (or some such container) of debris over the bank. In the process, they removed cultural deposits left by earlier occupants. Alternatively, secondary refuse deposition may have been characteristic of both occupations, demonstrating continuity. On the west side of Area A, several small piles of similar materials and consistent size were found. These also appear to be dumped hearth contents from the living areas.

Within Area A some activity loci were apparently spared from re-use. Four features dated around A.D. 100-200 are attributed to the Pelican Lake component. Three features

Figure 3-1. Overview of the Cooley Site Excavations



have dates placing them in the Late Prehistoric occupation (Munson, 1988). Within Area A, some activity loci contain no hearths, but include other features associated with Powers-Yonkee projectile points only. These features are tentatively attributed to the Powers-Yonkee component (by their spatial association with these points) and will be discussed in detail below.

On the east side of the spring, excavations continued into Area B, which was formerly cultivated. Below the plow zone a cultural stratum was discovered revealing a hearth, Feature 1-B, which dated to the accepted temporal range for Powers-Yonkee. Feature 1-B produced dates of 2820 \pm 80 B.P. (Beta 22510) and 3000 \pm 110 B.P. (Beta 23886). These dates were obtained from splitting a sample of charcoal taken from the feature. Three Powers-Yonkee projectile points were found adjacent to the feature, in the same strata, along with six non-diagnostic distal fragments of projectile points, five preform fragments, 25 bifaces or biface fragments, two Pelican Lake style projectile points, and a huge number of flakes. On the north side of Feature 1-B is a flake concentration (Feature 7-B) which produced 533 porcelanite flakes, six Phosphoria Formation chert flakes, two agate flakes, and six Tongue River Silicified Sediment flakes (Munson 1988). The non-local lithic material is believed to have come from sources along the perimeter of the Powder River Basin.

Feature 1-B is a three-sided arrangement of tabular sandstone blocks measuring 70 cm north-south by 70 cm east-west. The sandstone slabs form three sloping walls around the firing area in the center. The center of the feature is a shallow basin-shaped depression filled with charcoal, charcoal-saturated soil, and FCR. Outside the northern wall of the feature is an adjacent pit measuring 40 cm north-south by 35 cm east-west by 10 cm deep, filled with flakes, charcoal-saturated soil, and small bits of FCR.

Flakes from this pit and the concentration on the north side of Feature 1-B are

characterized by an unusually long, thin, blade-like appearance. Some of these measure 50-100 mm in length, 10 mm to 15 mm in width, but are no more than 5 mm thick. Similar blades are found in Paleoindian assemblages and are interpreted as cutting tools by Gramly (1990) and Frison and Bradley (1980). While these bear physical resemblance to blade tools, they show no wear associated with their use as cutting tools as described by Keeley (1980) and Frison and Bradley (1980). The lithic technology which produced these flakes, and their function, if any, is not clear. These flakes were most likely generated from a flake core. These blade-like flakes appear unusual because an analysis of the lithic materials from this site suggested that bifacial reduction was the primary technology employed (Herbort 1988a, 1988b).

The bottom of the main firing area of Feature 1-B exhibited evidence of heat oxidation. The FCR fill and pit lining rocks also displayed such evidence. This feature was the only rectangular hearth out of 25 hearths excavated at Cooley Site. Its date and structure make it unique at the site.

The occurrence of two Pelican Lake projectile points in spatial association with the Powers-Yonkee component in Area B is attributed to rodent activity. Evidence of rodent burrows occurs throughout the site area. Burrowing may have mixed the strata. The possibility of the coeval appearance of both point styles in this component cannot be absolutely discounted, however. Radiocarbon dates from Montana place Pelican Lake projectile points into the temporal range of the Powers-Yonkee component at the Cooley Site (Davis 1982; Munson 1990). No dates were obtained from the Cooley Site which could be called intermediate between the "normal" range for each component in this region.

Other features at the Cooley Site most likely associated with the Powers-Yonkee component include two bone-and-stone features and a stone arc. None were radiocarbon

dated, but each occurred in spatial association with Powers-Yonkee projectile points.

Feature 41 at the Cooley Site consists of a vertically-positioned sandstone slab 12 cm by 10 cm by 5 cm upon which a bison mandible rested. The sigmoid notch was firmly hooked onto the pointed top of the slab. The slab was fire cracked and oxidized by heat, but the mandible was not burned. The function is unknown. I propose the possibility that this arrangement was designed to hold the mandible in place such that the teeth could be used as a cutting or abrading tool of some kind. I have found no other references to similar features. John Brumley (personal communication 1993) reports that bison mandibles appear to have been used as cleavers in Late Prehistoric Period bison kill assemblages.

Feature 39 is also an isolated, vertically positioned sandstone slab of identical size. Bone fragments were found leaning on and adjacent to the slab. A Powers-Yonkee projectile point and a late stage biface were recovered adjacent to this feature. It is hypothesized that this is a construction similar to feature 41.

Feature 30 is a stone arc two meters in diameter. It consists of seven large sandstone slabs. A Powers-Yonkee projectile point was recovered adjacent to one of the slabs. The function of the arc is unknown, but it is hypothesized to be the remains of a shelter construction (Munson 1988).

Of the fifteen diagnostic specimens of Powers-Yonkee projectile points recovered from the Cooley Site, fourteen are made of local porcelanite, and one is made of a red chert associated with the Phosphoria Formation (Munson and Herbort 1985). The Phosphoria Formation outcrops in the northern Bighorn Mountain Range at the southern border of the Powder River Basin and in the Pryor Mountains at the west edge of the Powder River Basin (Ross et al. 1955).

In the artifact collection from the Cooley Site, Phosphoria chert was apparently

conserved for use as end scraper blades, presumably because of its relative hardness. This behavior applied to all components at the site. Evidence of conservation is apparent in the recovery of resharpening flakes, and totally exhausted Phosphoria Formation chert tools at the site. Other exotic materials such as Yellowstone Agate (available in Yellowstone or Tongue River gravels), brown agate (possibly Knife River Flint from North Dakota), Tongue River silicified sediment (along the Tongue River), obsidian (trace element analysis indicates Yellowstone Park sources), and various unidentified cherts all exhibit evidence of conservation and are quite rare at the site compared with local porcelanite (Munson 1988).

Interpretation of the Powers-Yonkee component at the Cooley site is difficult because of the extensive rodent disturbance and the mixing of components. The Cooley Site is typical of sites in the area located near permanent springs in having continuous prehistoric use. The range of radiocarbon dates and projectile point types recovered support this hypothesis. The discovery of the large trash middens suggest that at some point the site was reorganized, presumably after the deposition of the Powers-Yonkee component. However, the possibility of coeval occurrence of both Pelican Lake and Powers-Yonkee projectile point styles can not be ruled out.

Faunal remains from Cooley Site consisted primarily of *Bison bison*, though some deer, pronghorn, fox, marmot, grouse, and fresh water mussel (*unio sp*) remains were also recovered at the lowest cultural level (Munson 1988). Because of stratigraphic mixing, the association of any particular component to these remains is tenuous.

Other materials recovered from the Cooley site include: five hematite lumps, one limonite lump, four unfired clay balls, a limestone nodule, a melted ball of pine pitch mixed with charcoal, two sandstone abraders, one complete sandstone mano and several mano and metate fragments, one andesite mano, and two quartzite cobbles (Munson

1988). These materials are not discussed further here because of their uncertain cultural/temporal association.

Site 48CA1391

Site 48CA1391 is located on the bank of the Belle Fourche River south of Gillette, Wyoming. The Cordero Mining Company contracted with Metcalf Archaeological Consultants of Eagle, Colorado to conduct mitigative excavations of the site in 1987. John Albanese tested the site in 1986, and Anne McKibbin supervised the field work in 1987 (McKibbin et al. 1988).

Backhoe testing in 1986 indicated two buried cultural strata at the site. Excavation of 33 square meters of the site surface confirmed two subsurface components, underlying a layer of mixed components.

The lowest level, Component 1, is tentatively identified as a Late Plains Archaic component based on radiocarbon dates of 2830 \pm 50 B.P. (Feature 1), and 2840 \pm 70 B.P. (Feature 6) (McKibbin et al. 1988:22). Three projectile points were recovered including "a Pelican Lake Point...a transitional [point] between Hanna and Powers-Yonkee, and a side-notched point which is suggestive of an Early Plains Archaic form" (McKibbin et al. 1988:22). The identification of cultural/temporal affiliations based upon these points is tenuous.

A review of stratigraphic information from the site report confirms that Component 1 was indeed a mixed component. Each cultural stratum is only a few centimeters thick. Removal of overburden by backhoe reportedly damaged all dated features at the site (McKibbin et al. 1988:16). Because the features themselves were pits dug into the original ground surface, it is possible that as they were reached, the associated cultural levels had already been removed. The stratigraphic illustrations support this hypothesis.

If this is true, the features may be improperly assigned to a lower component.

Feature 1 in Component 1 is a slab-lined pit hearth at least 35 cm deep. Milling stone (metate) fragments were recovered from Feature 1. Feature 6 is a shallow basin-shaped oven with an irregularly contoured floor (McKibbin et al. 1988, Fig 11). The variation in feature construction is similar at Spring Creek.

Component 2 was located 15 cm above Component 1 (McKibbin et al. 1988). It seems reasonable to associate Component 2 with the Powers-Yonkee manifestation based upon the recovery of three diagnostic Powers-Yonkee projectile points and a radiocarbon date of 2760 \pm 60 B.P. from Feature 2 (McKibbin et al. 1988:29).

Two other projectile point fragments from this level reflect the Powers-Yonkee style as well. One of these projectile points is 8.1 mm at the neck, which is unusually small. Another projectile point recovered at this level resembles a Prairie side-notch (McKibbin et al. 1988) typical of the Late Prehistoric Period. Two of the Powers-Yonkee style projectiles exhibited wear patterns consistent with their use as knives (McKibbin et al. 1988:29). Feature 2 at this level is a basin-shaped oven. Faunal remains consist mostly of pronghorn. Freshwater mussel shells were also recovered in Component 2 (McKibbin et al. 1988:22).

Other dates from 48CA1391 came from charcoal in features located in strata above Component 2 in the "Mixed-levels" (McKibbin et al. 1988:33). A Pelican Lake style point was recovered from the "Mixed Levels" (McKibbin et al. 1988). Radiocarbon dates from these features fall into the accepted range for Late Prehistoric (1080 \pm 60 B.P.) and Late Archaic (Feature 5, 2320 \pm 50 B.P.). No projectile points were found in spatial association with Feature 5.

The Powers-Yonkee affiliation with Component 2 is convincing, despite the intrusion of Late Prehistoric material from upper strata. The variation of projectile points in

Component 1 is troublesome. Stratigraphic mixing of Powers-Yonkee and Pelican Lake materials cannot be ruled out, but it is also possible that these projectile point types are coeval at this site. A review of the illustration in McKibbin et al. (1988, Figure 22) seems inconsistent with the affiliation given to the projectiles from Component 1. Rather, the types seem to represent Powers-Yonkee, Pelican Lake, and a non-diagnostic proximal fragment which could well fit into the range of variation of either style. Because the dates associated with components 1 and 2 are clearly within the usual range for Powers-Yonkee, it must be assumed that either mixing or coeval occurrence is taking place.

Lithics from Component 1, in order of percentage of the total include: chalcedony, heat-treated chert, silicified wood, porcelanite, quartzite, silicified siltstone and obsidian (McKibbin et al. 1988). No source analysis of the obsidian was done. The material variety suggests a range of travel or trade outside the Powder River Basin.

Coeval occurrence of Powers-Yonkee and Pelican Lake point types is not considered in the site report. As is the case at the Cooley Site, coeval occurrence cannot be discounted. No convincing evidence of McKean Complex association is present at 48CA1391.

An interesting discovery at 48CA1391 was the recovery of the remains of at least six pronghorns from both Components 1 and 2. Recovery of cutting tools from Components 1 and 2 implies that the pronghorns were butchered on the site, but the means of procurement cannot be identified. Remains from at least two bison were also recovered (McKibbin et al. 1988). The tentative association of pronghorn with the Powers-Yonkee component at the Cooley Site becomes more substantial given this evidence.

McKibbin et al. also report the presence of charred vegetable remains from Feature 6

(2840 \pm 70 B.P.), and Feature 2 (2760 \pm 60 B.P.). Of the floral material recovered, Goosefoot (*Chenopodium*) and Prickly Pear (cf *Opuntia*) comprised 49% at Feature 6 and 44% at Feature 2. Pigweed (*Amaranthus*) and a grass family (*Poaceae*) also appear. As mentioned in the previous chapter, the occurrence of these floral remains does not prove they were a food resource, but this possibility should be considered.

The identification of pronghorn remains corroborates evidence from Cooley and Spring Creek which suggests a varied faunal subsistence. Previous descriptions of the Powers-Yonkee manifestation (Frison 1978; Miller 1985) were based upon bison kill site data and referred only to the bison resource. The mixed faunal resources evident in the Powers-Yonkee components at 48CA1391, Cooley, and Spring Creek compare well with the Pelican Lake assemblages from the Powder River Basin area. By all indications the occupants of this region relied heavily upon bison, but used other faunal, and possibly floral, resources when available.

The Spring Creek Site, 24BH2521

Site 24BH2521 is located at the confluence of the South Fork of Spring Creek and an ephemeral drainage on the Spring Creek Coal Company Mine. The site was located during a 1990 cultural resource inventory conducted by GCM Services Inc., Butte, Montana. The site was excavated in the summer of 1991 under the direction of Gene Munson to mitigate the effects of coal mining operations. I assisted in the excavation and performed an analysis of the lithic materials. The site is located a few miles west of the Tongue River Reservoir near Decker, Montana and is about seven miles south of the Kobold Site (24BH406).

The physical setting is a flat terrace above the confluence of the South Fork Spring Creek and an unnamed ephemeral drainage. The South Fork intermittently flows within a mile of the site area. Shallow, water-bearing coal seams are responsible for the perennial nature of this small drainage. The surrounding country consists of rough scoria hills and

sandstone outcrops common to the Fort Union Formation. Groves of Juniper and Ponderosa Pine are present. The site lies in a Ponderosa Pine Savanna vegetation zone (Payne, 1973).

A total of 531 square meters of the site surface was hand excavated, exposing 19 distinct areas of cultural occupation. These areas appear to represent the remains of short term occupations by small groups. Collectively, 24BH2521 contains evidence of four cultural/temporal components; Powers-Yonkee, Pelican Lake, Besant, and Late Prehistoric. The Powers-Yonkee and Besant components comprised the bulk of the cultural material recovered.

The Powers-Yonkee Component occurred on the southeast portion of the site in Activity Loci 1, 2, 5, and 9 (Figure 3-2). Eleven radiocarbon dates were obtained (Table 2-2). The stratigraphy was well defined in these areas. Activity Locus 1 (Figure 3-3) contained no debitage-sterile stratum and was considered one unit for lithic analysis. At Loci 2 (Figure 3-4) and 9 (Figure 3-5) it was possible to use the stratigraphic profile to isolate the Powers-Yonkee component for lithic analysis. Locus 5 lacked lithic material.

Twenty-five features were associated with the Powers-Yonkee component at Spring Creek. These included 14 surface hearths, two pit hearths, four combination pit hearths and ovens, three pit ovens, an FCR dump, and a stone ring. Ovens were distinguished from hearths by a comparatively minor soil alteration/oxidation, less charcoal but more fire-cracked rock and burned bone. Ovens were typically heated with rocks fired in an adjacent hearth. This is inferred from a lack of heat oxidized soil and charcoal in the oven features. Experimentation by Munson (1992: Appendix G) demonstrated the effects of thermal alteration of the ambient soil in a variety of hearth use conditions. Three of the surface hearths were near, but not connected to, the pit ovens and may have provided the source of heated rocks for those ovens.

Activity Locus 1

Activity Locus 1 consists of 42 square meters of site surface (Figure 3-3). This locus contains two distinct cultural strata, Besant and Powers-Yonkee. These strata are distinctly separated in the stratigraphic profile. A total of 668 pieces of lithic debitage, an endscraper, a bifacial drill, a flake tool, and two non-diagnostic point fragments were recovered from this locus. Because lithic debitage was recovered in both strata as well as the intermediate stratum, analysis of the lithic debitage was neither attempted nor was association of these materials established. Soil characteristics determined that the lower horizon in Locus 1 was a continuation of the horizon bearing a Powers-Yonkee component in nearby Locus 2. Two unprepared surface hearths were discovered in the lower stratum. These consisted of roughly circular patches of red (oxidized) soil, consistent with the remains of a small campfire. These features contained insufficient carbon for dating.

Activity Locus 2

Activity Locus 2 consists of an area of 124 square meters (Figure 3-4). There are two components present; Besant and Powers-Yonkee. These are separated by a sterile stratum 10 to 15 centimeters thick. Nine projectile points were recovered from the Powers-Yonkee component. A total of 18 features was identified in the Powers-Yonkee component at this locus. Radiocarbon dates corroborate the Powers-Yonkee projectile points.

The artifact collection in the Powers-Yonkee component at Activity Locus 2 consists of 1,180 pieces of debitage and 19 chipped-stone tools. With the exception of nine obsidian flakes, the lithic material is entirely porcelanite. This activity locus contained the only obsidian items recovered at Spring Creek. Trace analysis suggests that the obsidian came from near Yellowstone Park (Munson 1992).

Figure 3-2. Overview of Activity Loci at 24BH2521

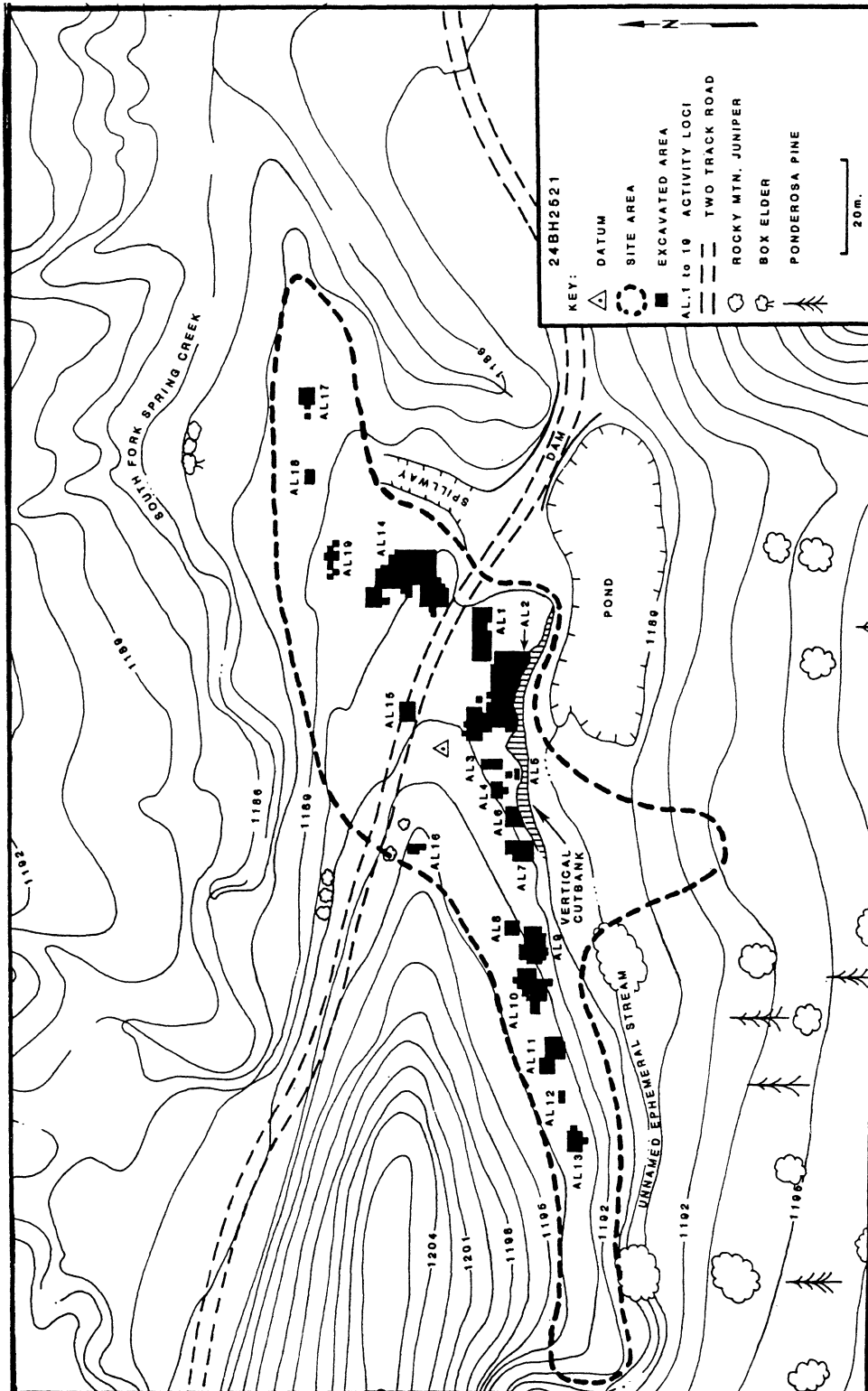


Figure 3-3. Planview of Activity Locus 1 at 24BH2521

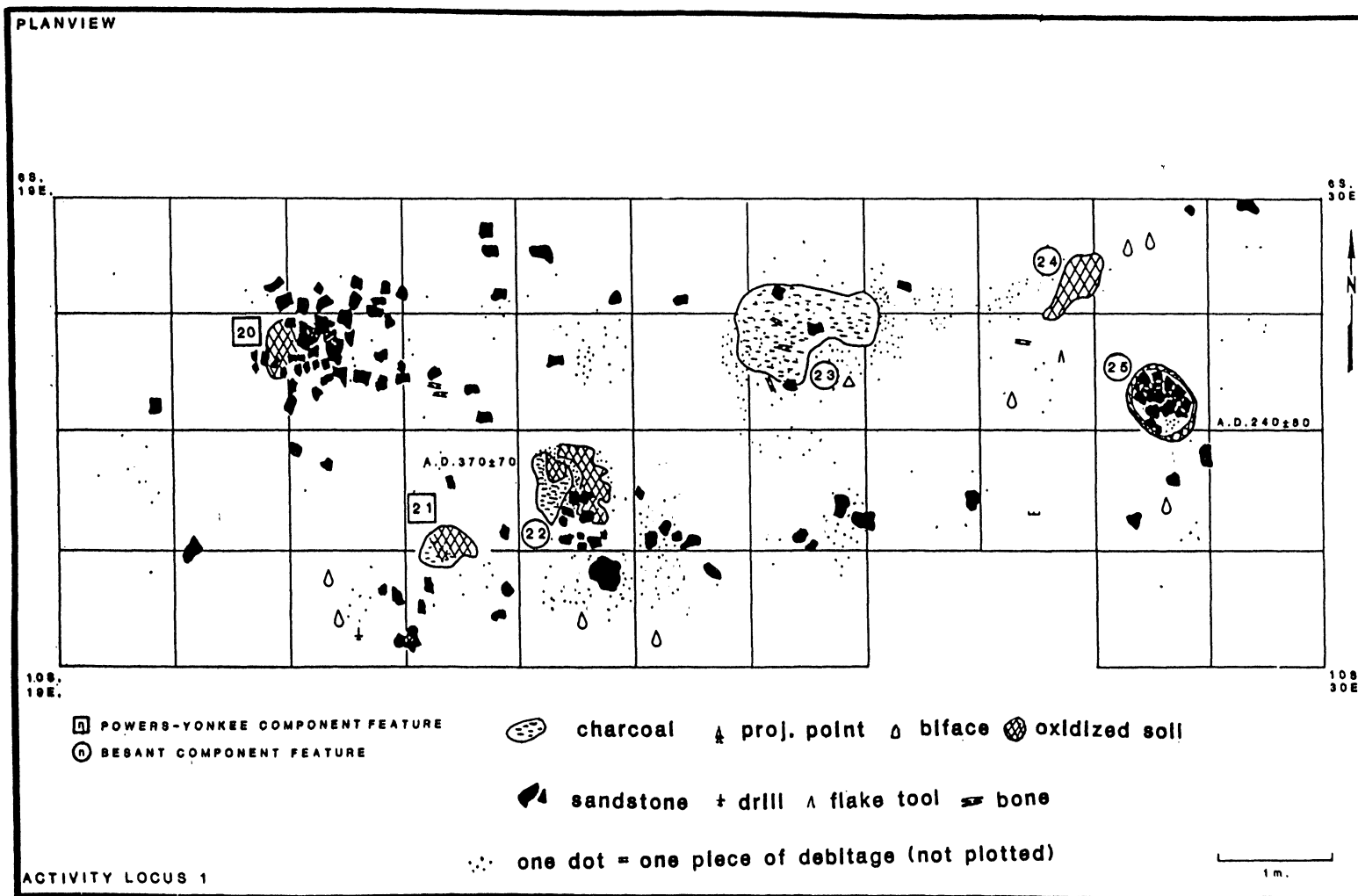
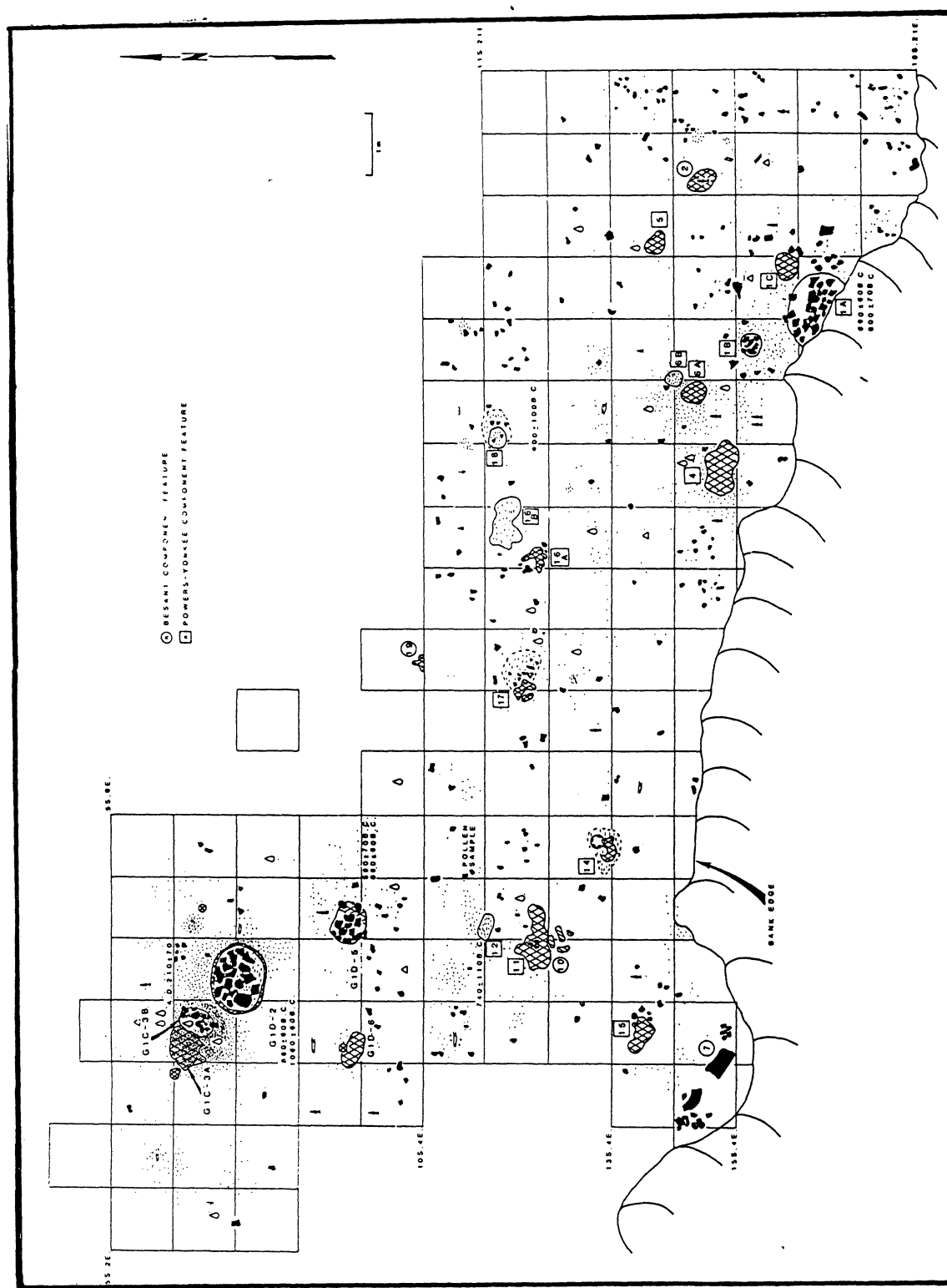


Figure 3-4. Planview of Activity Locus 2 at 24BH2521



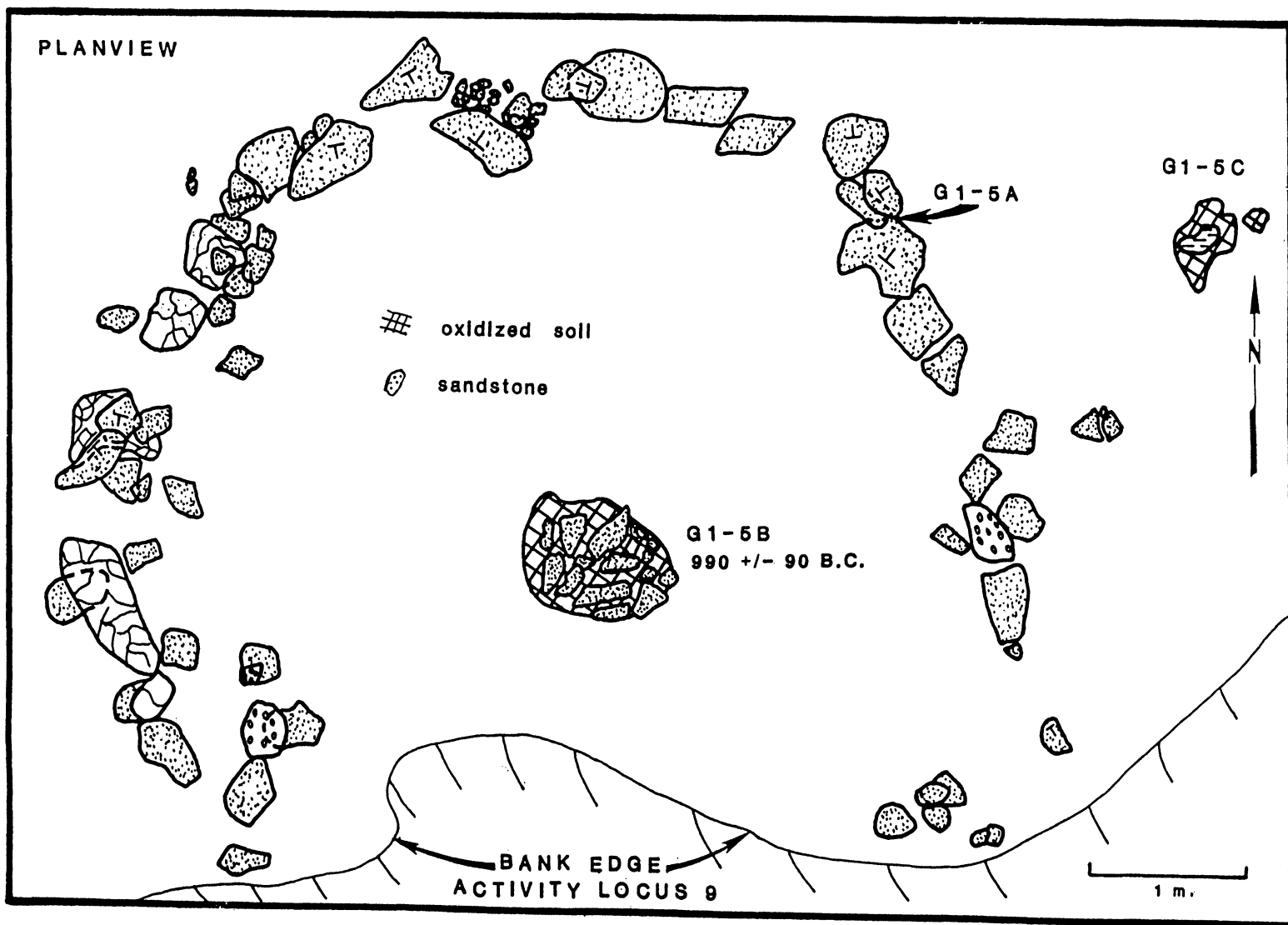


Figure 3-5. Planview of Activity Locus 9 at 24BH2521

The tool collection in the Powers-Yonkee component consists of nine projectile points and 10 bifaces. For purposes of this paper, *bifaces* refers to pieces of raw material from which flakes have been removed from both surfaces, and hafting modifications are not present. Based upon the reduction techniques used, bifaces may be categorized by various stages of reduction. Flake scars and striking platforms are indicative of these techniques (Herbort 1988a, 1988b; Munson and Herbort 1985). The analysis of over 20 Late Plains Archaic Period collections from the Pine Breaks areas indicates that bifacial reduction, as opposed to flake core reduction, was the dominant lithic reduction strategy used. (Munson and Herbort 1985; Herbort 1990; Ferguson 1993).

All projectile points from Spring Creek are made of locally available porcelanite. The average neck width is 12.55 mm. Of these, five exhibit impact fractures to the distal ends, one exhibits a transverse bend fracture (suggesting manufacturing error), and three exhibit extensive resharpening. Their forms are consistent with the points from known Powers-Yonkee components.

At Activity Locus 2, eighteen features were exposed in the Powers-Yonkee component. Twelve are surface hearths, two are pit hearths, and four are combination pit hearths and ovens. The association of Features G1D-2 (Figure 3-6) and G1D-5 (Figure 3-7) warrants discussion as this is the most elaborate pit hearth and oven combination in the Powers-Yonkee component. Feature G1D-2 was basin-shaped with a uniform oxidized soil lens outlining the entire pit. A total of 53 kg of FCR was recovered from the pit, but there is no evidence of a rock lining. I propose that rocks were heated in hearth Feature G1D-2 and were used for heat in the adjacent pit oven Feature G1D-5. Feature G1D-5 is a barrel-shaped pit oven filled with dark soil and FCR. Charcoal, presumably from G1D-2, was found, but no evidence of heat oxidation is present. This suggests that heated rocks were scooped from the hearth (along with some charcoal) and

placed in the oven, where temperatures were too low to oxidize the soil.

Features G1D-2 and G1D-5 each produced a pair of radiocarbon dates taken from split samples of the hearth contents. All four dates are within the accepted range for the Powers-Yonkee manifestation, but the dates from these samples seem to be measuring different events (Chapter 2). However, one sample from each feature yielded a common date of 2810 \pm 60 B.P. Two Powers-Yonkee projectile points were found in spatial association with these features.

Activity Locus 5

Two hearths were excavated in Activity Locus 5: surface hearth feature G1D-4, and pit hearth feature G1D-3. Feature G1D-3 produced a radiocarbon date of 2920 \pm 80 B.P. Exploratory scraper work was included as a final step in the evaluation of this terrace and this locus was crudely "discovered" during mechanical scraping. Due to continued afternoon rains, the ground had become soft by the time this area was scraped. Generally the scraper operator removed only a couple centimeters of soil at a time, but in this instance the scraper sank into soft ground and depth control was lost. Unfortunately, lithic materials may have been removed by the scraper as none were found in association with Feature G1D-3.

Activity Locus 9

Activity Locus 9 (Figure 3-5) contained three features attributed to the Powers-Yonkee component. Feature G1-5A is a stone ring, constructed of large sandstone slabs. In the center of this ring was a surface hearth, Feature G1-5B. A surface hearth/pit oven, Feature G1-5C, was located outside the ring.

Feature G1-5A is located on the bank of an ephemeral drainage. Scraper work exposed the top of one rock, and additional soil probing revealed the extent of the feature. On the south side, approximately 20% of the ring had sloughed into the arroyo. The

Figure 3-6. Planview/profile of Feature G1D-2 at Locus 2

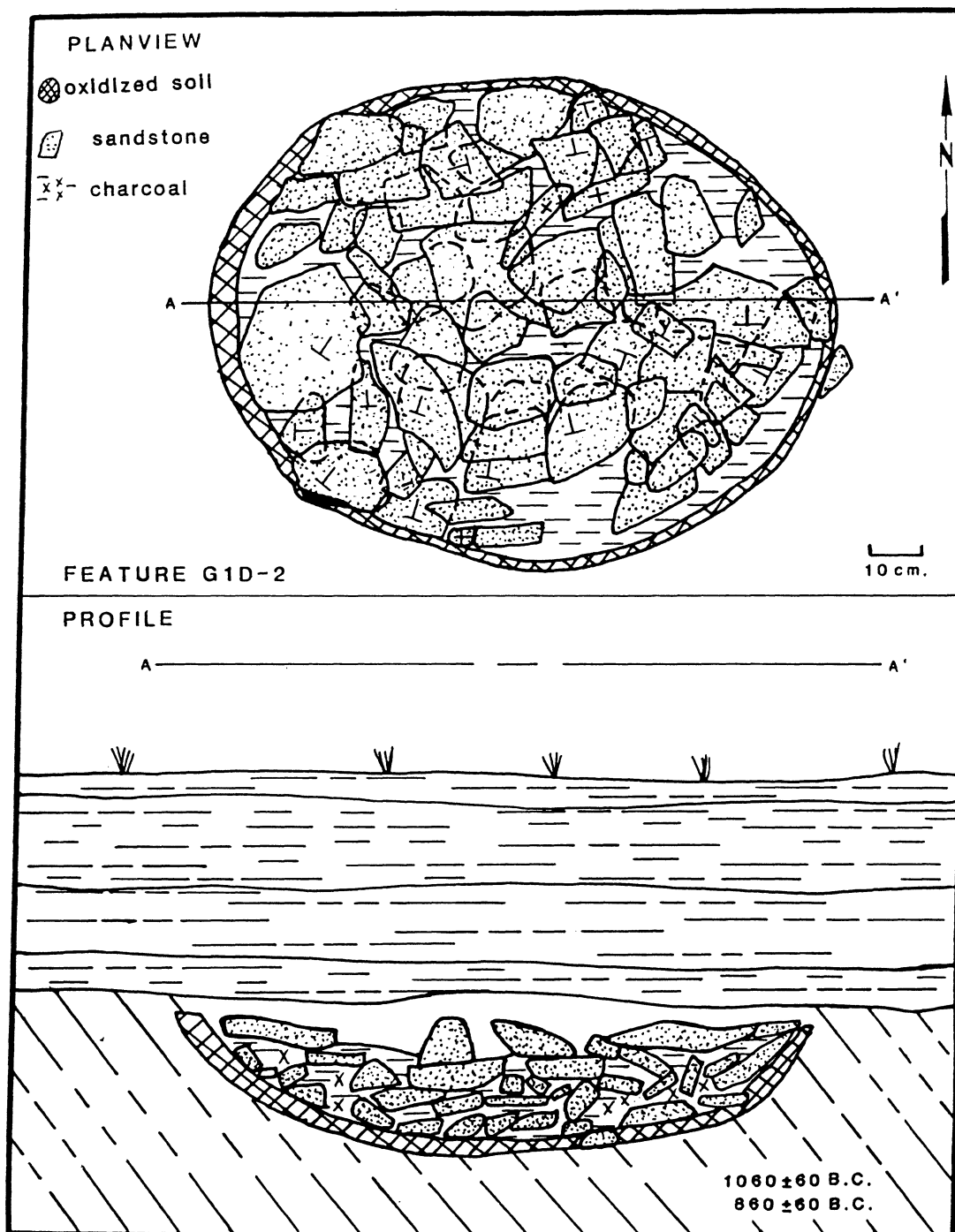
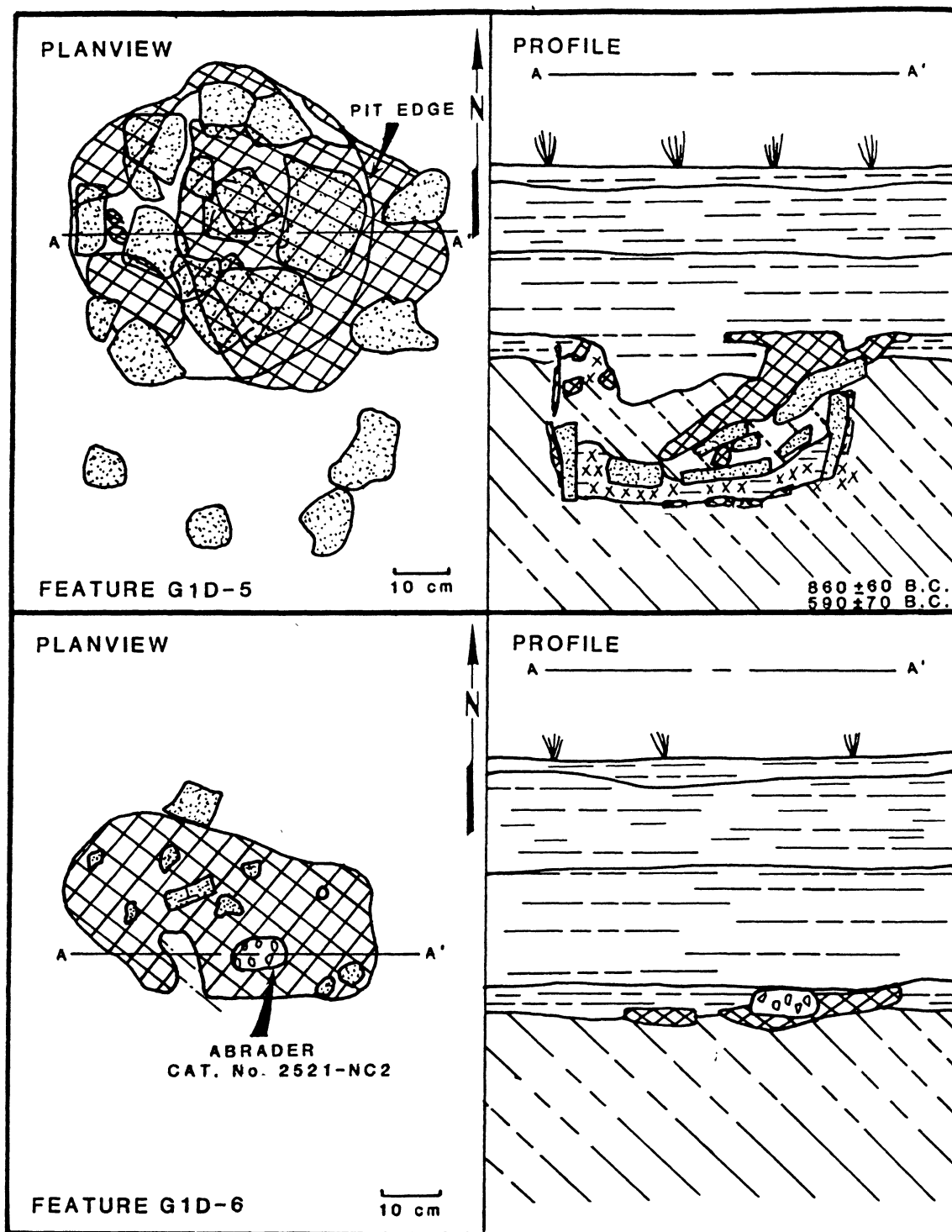


Figure 3-7. Planview/profile of Feature G1D-5 and G1D-6 at Locus 2



remaining portion of the ring consisted of 62 sandstone slabs, some as big as 60 cm across, but quite thin. A total of 428 kg of rock was used to construct the ring. The ring diameter was six meters. The ring probably related to a dwelling structure or delineated a specific activity space. Feature G1-5B was located in the center of the ring. It consisted of a shallow basin of oxidized soil and fire-cracked sandstone rocks, with fire-oxidized sandstone slabs lying on top. Firing oxidation was exhibited on only one side of some of these slabs. Possibly they once formed a partial wall around the fire, with the other rocks placed in the fire. Adjacent to this hearth was a concentration of 44 porcelanite flakes. Charcoal from Feature G1-5B produced a radiocarbon date of 2990+/-90 B.P.

Feature G1-5C consisted of a shallow lens of oxidized soil with charcoal particles and an adjacent basin shaped pit oven 20 cm deep and filled with ash, FCR, and dark soil. This is the only combination surface hearth and pit oven found at the site. This feature was located 1.5 meters east of the ring. The oxidation horizon was 13 cm thick, indicating prolonged use or re-use of fire in the hearth. In replicated experiments, a fire was constructed near the site on bare dirt and was fueled with local pine and juniper. The fire was maintained for about 16 hours over a two day period, and yielded an oxidation horizon only one or two cm thick. The profile of Feature G1-5C indicated that a shallow basin was dug prior to firing. There wasn't enough charcoal to radiocarbon date this feature, but the hearth was associated with the Powers-Yonkee component by soil stratigraphy.

The hearth and oven features in the Powers-Yonkee component are indistinguishable in construction and intra-site distribution from other Late Archaic components in the Powder River basin. The stone circle was an unusual feature, as these are relatively rare in the Pine Breaks areas. Frison (1978: 51) assigns stone circles to as far back as his Middle and Late Plains Archaic Periods, but it is not clear how he made the temporal

association. In any case, the Powers-Yonkee manifestation can now be associated with stone circles.

Floral remains from the Powers-Yonkee component at Spring Creek included charred seeds of *Chenopodium* (Goosefoot), and *Amaranthus* (Pigweed) (Aaberg 1992). Charred wood remains included ponderosa pine and willow (Burke 1992). Faunal remains from the Powers-Yonkee component include bison and freshwater molluscs (mussel shell). A granitic mano was also recovered.

CHAPTER 4. SUMMARY DISCUSSION

This synthesis of current data for Powers-Yonkee components leads to several conclusions, and of course, much speculation. The evidence suggests that the Powers-Yonkee projectile point is stylistically unique and recognizable within the Powder River Basin. The Powers-Yonkee projectiles have been associated with a period of time ranging (roughly) from 3100 to 2400 years B.P. The people who used this projectile point killed bison in a sophisticated, communal manner. From the current evidence, it appears that they processed bison in a manner different from other cultural /temporal groups.

Given the small number of verified sites, no precise determination of the geographic distribution of the Powers-Yonkee manifestation can be made, but the Powder River Basin (as defined here) encompasses those sites which have been dated. Beckes and Keyser (1983), Rueblemann (1983) and Deaver and Deaver (1988) constructed overviews of this region. Each report discusses the occurrence of the Powers-Yonkee projectile point and the need for further information to define that cultural material. Deaver and Deaver (1988: 93) state: "Apparently the Powers-Yonkee phase was a localized development with restricted geographical distribution and fairly consistent behavioral and artifactual traits." Gregg (1985) mentions that the distribution of Powers-Yonkee type points extends to western North Dakota. Gerald Clark (1982) reports a site in Garfield County, Montana (north of the Yellowstone River) which appears to have a Powers-Yonkee component. Davis and Helmick (1982) suggest that the Powers-Yonkee point occurs as far west as Townsend, Montana. Although new information may expand the accepted spatial distribution of this manifestation, currently its range is defined by: Powers-Yonkee projectile points; dates of 2400 to 3100 B.P.; association with bison; and, regional location in southeastern Montana and northeastern Wyoming.

The Deavers' (1988) suggestion of a "localized development" cannot be disputed by the evidence. From this research, it appears that the Powers-Yonkee manifestation is a regional adaptation. I propose that the spatial distribution of the Powers-Yonkee manifestation is correlated to the distribution of a particular physical environment. Key features of this environment are the Pine Breaks and Grassland Ecozones associated with the Fort Union Formation. These areas offer shelter, water and visual relief from the sage/grassland and shale badlands. Numerous botanical resources have been documented (Aaberg 1992; Deaver and Deaver 1988). Bison and other faunal resources were abundant. Lithic resources (porcelanite) were abundant.

Richard Hughes, of GeoChem Lab, Rancho Cordova, California (Hughes 1988; 1992) identified the Obsidian Cliffs area of Yellowstone National Park as the source of what little obsidian debitage was recovered from Powers-Yonkee components at Cooley Site and Spring Creek. This suggests that the makers of the Powers-Yonkee projectile point either visited this obsidian source or traded with people who did. Munson (1992) speculated that Powers-Yonkee campsites may be found between their known area of occupation (the Powder River Basin) and the Obsidian Cliffs area if this was a destination resource.

Indeed, a recent (unpublished as of February, 1993) inventory and assessment project conducted by Ethnoscience, (a Billings, Montana consulting firm) reveals an apparent Powers-Yonkee campsite (currently listed under site number 24CB1266 and 24CB1267) in the Pryor Mountain foothills (Lynn Peterson, personal communication, 1993). Powers-Yonkee type projectile points were found along with a hearth feature dating to 2720 \pm 60 B.P. This site has not been excavated so further information is not yet available. At the eastern foot of the Beartooth Plateau, this location is between Obsidian Cliffs and the Powder River Basin. It would be interesting to see if Pryor Mountain

cherts (Phosphoria Formation) or Yellowstone obsidian dominate the lithic collection at this site. This location represents the current western extreme for Powers-Yonkee sites. At present, Powers-Yonkee material has not been reported from the high altitude environments adjacent to the Powder River Basin in the Bighorn, Pryor, or Beartooth Mountains. Surface finds of Powers-Yonkee points are reported from only the eastern edge of the Black Hills (Alice Tratebas, Personal Communication 1993).

Unique Projectile Point Type

I am not comfortable making a projectile point style the basis for ethnic identity or affiliation. Perhaps too much emphasis is placed on a common, disposable item which takes only minutes to manufacture. At this time, however, it appears that only one projectile point style was being used repeatedly in the Powder River Basin during the period from 3100 to 2400 years ago. The relationship of this projectile point style to preceding and proceeding styles is unknown.

Current research suggests that the relationship between Powers-Yonkee and Pelican Lake is closer than previously considered. In archaeological literature of the Northwestern Plains, the ubiquitous corner-notched projectile point is commonly homogenized into a type called Pelican Lake and is associated with the Late Plains Archaic Period (Frison 1978, 1991). Reeves (1970) and Davis (1982) report the corner-notched point (Pelican Lake?) appears around 3000 B.P. Both corner-notched and Powers-Yonkee components occurred at Cooley Site and 48CA1391. At each site these components were difficult to separate. Corner-notched points appear at the Kobold Kill Site. The Ayers-Fraizer Bison Kill, 24PE30, is a bison kill in the Powder River Basin associated with corner-notched projectile points (Clark and Wilson 1981). A bone sample from that site dated 2180+/-150 B.P. (Clark and Wilson 1981). A photo of the

projectile points (Clark and Wilson 1981:30) shows two specimens which appear to be classic examples of the Powers-Yonkee type. The Upper Miles Bison Kill in the Powder River Basin dates to 2470 \pm 110 B.P. and is associated with corner-notched projectile points (Reeves 1970:321). The "Late Archaic" component at 24RB1164 (Munson 1990) produced two corner-notched and two "base-indented, corner-notched" points which resemble the Powers-Yonkee type. Dates of 2440 \pm 80 B.P. (Beta 33636), 2540 \pm 100 B.P. (Beta 33633), and 2570 \pm 60 B.P. (Beta 33626) were obtained from that component (Munson 1990:11-2). Clearly the relationship of components containing both point types is worthy of additional study.

The Powers-Yonkee and McKean Complex relationship is more tenuous. To date, no reliable association can be made between McKean variants and Powers-Yonkee projectile points. Claims of association are based strictly on comparisons of projectile point variability within collections. Until the point types can be shown to have overlapping distributions in space and time, this relationship will be poorly understood. Keyser and Davis (1984) mention a gap of 1000-700 years in the archaeological record between Pelican Lake and McKean in the Bighorn Basin. They had four occupation levels of unknown affiliation within this time period at the stratified Lightning Springs (North Cave Hills, northwest South Dakota) campsite. Keyser and Davis (1984: 17) also mention a Powers-Yonkee type point from the Pelican Lake component which: "...implies that it is a specimen found and re-used by Pelican Lake Phase people."

Features

Feature type and construction can not yet be used to differentiate components left by the users of Powers-Yonkee projectile points from those left by earlier occupants of the same geographical area (the McKean Complex) or later occupants (the Pelican Lake

"Phase"). Powers-Yonkee components contain a variety of shallow basin-shaped, slab-lined hearths, unprepared surface hearths, and basin and barrel-shaped rock-filled ovens. These feature types are common to both McKean and Pelican Lake components within the Powder River Basin.

The Powers-Yonkee point occurs in spatial association with a large stone circle, and a stone arc, presumably parts of shelter structures. Stone circles are known to occur in McKean components as well as in later occupations (Frison 1978:51).

Munson (1992) addresses the spatial arrangement of hearth and oven features found at Spring Creek suggesting that future excavations be compared with that arrangement to determine whether the spatial distribution of features is similar on an inter-site basis and whether the intra-site feature distribution is distinctive for Powers-Yonkee sites. If the arrangements prove distinctive, such feature patterns may be used to classify Powers-Yonkee assemblages. The Powers-Yonkee component at Spring Creek suggests that pit hearth and oven features are associated. This may be a distinct cultural or functional arrangement and should be investigated at future Powers-Yonkee excavations. Tables 4-1 and 4-2 present a summary of types and attributes associated with Powers-Yonkee components discussed in Chapter 3.

Distinctive Bison Bone Middens

Frison (1978:203-211) identified a distinctive characteristic at the four Powers-Yonkee bison kills discussed in this paper. Powers-Yonkee communal bison kills exhibit a method of butchering unlike other recognized groups. They made little or no effort to break bones for marrow extraction, and removed the soft tissue in a manner which left the skeleton largely intact. Evidence of stone boiling was not observed. Neglecting these

Table 4-1: Types and Attributes Associated with Powers-Yonkee Campsites

	^Cooley Site 24RB1059	~48CA1391	^^Spring Creek Site 24BH2521
Projectile Point Affiliations			
Association with Powers-Yonkee point type	yes	yes	yes
Possible association with McKean point type	no	no	no
Possible association with Pelican Lake point type	yes	yes	no
Possible association with Besant point type	no	no	no
Lithic Technology Attributes			
Flake generation cores	no	no	no
Biface Fragments (inferred bifacial reduction)	yes	yes	yes
Drill, Awl or Graver	yes	no	no
End Scraper	†yes	yes	no
unifacial flake scraper	†yes	yes	yes
Modified Flake tool	†yes	yes	yes
Ground stone tools (metate, mano or abraders)	yes, ss metate, ss mano frags.	yes, ss metate, ss mano frags.	yes, granitic mano,
Lithic material (by percentage of total)	por(98), ba,	unc(23), ag(21), sw(15), nvg(13), por(12), trss(12) qtz (4), ob	por(96+), ph, qtz, nvg, ba, unc, ob, trss
Feature types			
Pit hearth (firing area)	yes, slab-lined	yes	yes
unprepared surface hearth (firing area)	†yes	no	yes
Pit ovens (non-firing area)	yes, basin-shaped	yes, slab-lined	yes, slab-lined & unlined
Mandible & stone upright feature	†yes	no	no
Stone circle feature	yes	no	yes
Faunal remains (by percentage of total)	bison, †pronghorn, †deer, †fox, †marmot, †grouse, freshwater mollusc	pronghorn, bison, freshwater mollusc	bison, freshwater mollusc
macrofloral remains (charred, from hearth/ovens)	P.pine, Ω (no analysis)	Goosefoot, Prickly pear, Pigweed	P pine, Goosefoot, Pigweed, willow

^Munson (1988), ~McKibbin et al. (1988), ^^Munson (1991)

†May be associated with another component, Ω hearth and soil samples available for further analysis

por=porcelanite, ob=obsidian, ba=brown agate (e.g. KnifeRiver Flint), nvg=non-volcanic natural glass, ph=Phosphoria formation chert, qtz=quartzite, ag=Agate, ccs=cryptocrystalline silica, unc=unidentified nodular chert, sw=silicified wood, trss=Tongue River silicified sediment, ss=sandstone

Table 4-2: Types and Attributes Associated with Powers-Yonkee Bison Kill Sites

	# Powers-Yonkee 24PR5	* **Kobold 24BH406	Mavrakis-Bentzen-Roberts * ¥¥ (Buffalo Creek Site) 48SH311	* *-Powder River 48SH312
Association with Powers-Yonkee points	yes	yes	yes	yes
Possible association with corner-notched (Pelican Lake) point	no	yes	no	no
Possible association with McKean Complex points	no	no	no	no
Type of Kill Site	trap or pound	jump	trap or pound	trap or pound
Observed remains of artificial structures used to control bison	no	†yes	no	no
Raw materials represented in the lithic collection (percentage of currently known collection)	por (87), qtz (6.2) ccs (2.5), ag (1.2), ob (1.2), sw, ba, trss	por (93), qtz (3), unc (3), ob (1)	por (81), qtz (11), ag (7)	por(80), qtz (12), unc (8)
Associated lithic tools and technology				
Flake generation cores	no	no	no	no
Bifaces (actual or inferred from bifacial platform flakes)	yes	yes	yes	no
Flake tools (including plano-convex unifaces & related flakes)	yes	yes	yes	yes
Cobble tools	no	2, granite	1 granite	no
Other tools, artifacts, or materials	none	shell fragments shell bead	stone wedge used to split bone	bone needle
Faunal remains associated with site	Bison	Bison	Bison	Bison
Estimate of season	mid-late summer	fall	early spring and late fall	unknown
Selective dart placement (implied restricted herd mobility)	yes, rib and neck	yes, rib and neck	yes, rib and neck	yes, rib and neck
Butchering by meat stripping, skeleton articulated	yes	yes	yes	yes
Evidence of use of brains (damaged skulls)	no	no	no	no
Removal of tongue (hyoid & mandibles disarticulated from skull)	unknown	unknown	unknown	no
Marrow extraction (bones broken, diarticulated)	yes, limited	yes, limited	yes, limited	no
Evidence of stone boiling (pit features, bone fragments, FCR)	no	no	no	no

por=porcelanite, ob=obsidian, ba=brown agate (e.g. Knif River Flint), nvq=non-volcanic natural glass, ph=Phosphoria formation chert, qtz=quartzite,

ag=Agate, ccs=cryptocrystalline silica, unc=unidentified nodular chert, sw=silicified wood, trss=Tongue River silicified sediment

Roll et al. (1991), * Frison (1978), ** Frison (1970), *-Frison (1968a), ¥ Bentzen (1961), ¥¥ Bentzen (1962)

† May be associated with another component at the site

sources of nutrition is uncommon in later prehistoric bison kills. Roll et al. (1991) partially concur with Frison's interpretation.

Frison (1991:199) has hypothesized that the Powers-Yonkee bison kills occurred in the late summer or fall to prepare surplus food for consumption in winter. Faunal analysis from three of the Powers-Yonkee bison kill sites seem to support his hypothesis. The three campsites presented here offer evidence of other food resources as well. Bison was apparently a primary food source, but Powers-Yonkee components also include antelope and other mammals, freshwater mussels, and *chenopodium* seeds. The current abundance of edible starchy root plants, wild plums, and numerous berries in the Powder River Basin suggests that these would have been used by prehistoric occupants of the region, although evidence of this is not found in the archaeological record.

In recognition of the limitations of a sample consisting of only seven sites, conclusions are tentative. Deaver and Deaver (1988:93) speculate that, "...the Yonkee phase is largely a localized functional site type of a larger [Pelican Lake] unit." Initial indications suggest that this may be the case. Evidence of linear relationships is unavailable, but patterns of association imply that the Powers-Yonkee manifestation represents a local variation of the corner-notched projectile points generally associated with Pelican Lake. In terms of a general cultural chronology, Powers-Yonkee fits into the Late Plains Archaic Period as described by Frison (1978, 1991).

Additional information on the climatic episodes from 4000 to 3000 B.P. would be useful for investigating the relationship of the McKean and Powers-Yonkee manifestations. Site frequency suggests that occupation of the Powder River Basin increased dramatically from the time of the McKean Complex to the Pelican Lake Phase (Munson 1991). Climatic data may explain why the Powder River Basin was less hospitable prior to 4000 B.P. or if a series of erosional and depositional episodes

(Bryson 1970) account for the paucity of Early Plains Archaic material in this area. Cultural organization may also affect site recovery.

The recovery of floral resource material would help to create a more complete culture history for the Powers-Yonkee manifestation. The investigation of a Powers-Yonkee component from outside the Powder River Basin would be welcomed. Future investigations should use consistent and complimentary research designs incorporating data from paleoclimatology, paleobotany, geomorphology, trace element analysis, and liberal numbers of C-14 dates.

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